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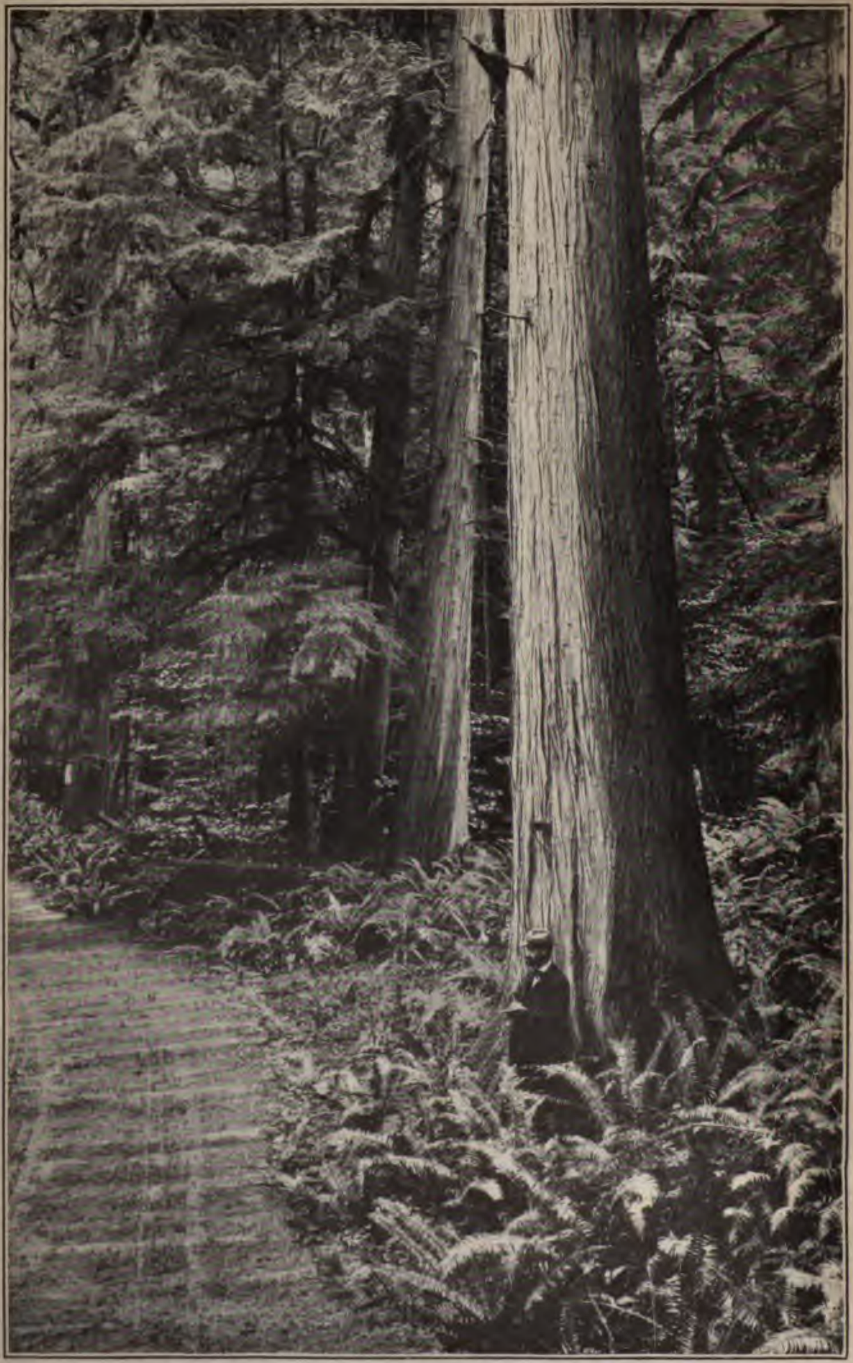

GIANT CEDARS (THUJA PLICATA).

In moist land near Elbe. Shield ferns (Polystichum munitum) in the foreground and hemlocks (Tsuga heterophylla) in the background. Reproduced by courtesy of the Forest Service.

FLORA OF WASHINGTON.

ADVERTISEMENT.

The United States National Herbarium, which was founded by the Smithsonian Institution, was transferred in the year 1868 to the Department of Agriculture, and continued to be maintained by that Department until July 1, 1896, when it was returned to the official custody of the Smithsonian Institution. The Department of Agriculture, however, continued to publish the series of botanical reports entitled "Contributions from the U. S. National Herbarium," begun in the year 1890, until, on July 1, 1902, the National Museum, in pursuance of an act of Congress, assumed responsibility for the publication. The first seven volumes of the series were issued by the Department of Agriculture.

Richard Rathbun,
Acting Secretary of the Smithsonian Institution.

SMITHSONIAN INSTITUTION
UNITED STATES NATIONAL MUSEUM

CONTRIBUTIONS

FROM THE

UNITED STATES NATIONAL HERBARIUM

VOLUME XI

FLORA OF THE STATE OF WASHINGTON

NOTE TO THE READER

The paper in this volume is brittle or the inner margins are extremely narrow.

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V. PIPER

WASHINGTON
GOVERNMENT PRINTING OFFICE
1906

BULLETIN OF THE UNITED STATES NATIONAL MUSEUM:
ISSUED OCTOBER 8, 1906.

PREFACE.

The following account of the flora of the State of Washington, by Prof. C. V. Piper, is based on his study of the plants of that State during a period of twenty years. This work was carried on in chance hours of leisure and in occasional summer vacations. During most of the college year 1899–1900, however, Professor Piper was at the Gray Herbarium looking up critical material and examining the specimens of older collectors, especially those upon which publications had been based. Considerable time was devoted also to other large herbaria, particularly those of the United States National Museum, of the Academy of Natural Sciences of Philadelphia, and of the New York Botanical Garden. The private herbaria of Prof. L. F. Henderson, of Mr. Thomas Howell, and of Mr. W. N. Suksdorf were likewise freely consulted.

Most of the types of the new species published by Professor Piper in the present work and in earlier papers are in the United States National Herbarium, and a large part of the whole material on which this flora is based is also represented there.

In the course of his work Professor Piper examined specimens of nearly all the collections made within the confines of the State of Washington, so far as these are to be found in American herbaria. Thus it was possible to ascertain the identity of nearly all the species which had been accredited to the State through erroneous determination. Unfortunately several of the specimens upon which the names in published lists were based are not now to be found in the herbaria in which they might be expected. This is true particularly of Cooper's plants and in less degree of those of the Wilkes Expedition, so that the identity of such plants can only be surmised. In publications on the collections of Menzies, Douglas, Scouler, and Tolmie there are many plant names that can be definitely rectified only by examining the original specimens. It is quite certain also that the current interpretation of a number of species based on these early collections is erroneous. Their correction will require an examination of the types, which are in European herbaria.

With few exceptions no species has been admitted into this flora unless its author has actually studied Washington specimens.

In the course of the preparation of this work Professor Piper became indebted to many botanists for assistance. He states that he

160799

is under especial obligations to Prof. B. L. Robinson, of the Gray Herbarium, for kindly counsel, as well as for much aid in the genus Lupinus; to Mr. Frederick V. Coville, of the National Herbarium, for his continuous helpful advice; to Dr. N. L. Britton, of the New York Botanical Garden, Mr. Stewardson Brown, of the Academy of Sciences of Philadelphia, and Dr. C. F. Millspaugh, of the Field Columbian Museum, for the privileges of consulting the herbaria of which they have charge; to Mr. M. L. Fernald, of the Gray Herbarium, for technical assistance in various genera; to Dr. J. M. Greenman, of the Field Columbian Museum, for aid in Senecio; to Mr. A. A. Eaton, for a key to the species of Isoetes; to Mr. P. L. Ricker and Mr. W. F. Wight, of the Department of Agriculture, for assistance in bibliography; to Dr. Theodor Holm and Prof. C. F. Wheeler for aid in the genus Carex.

Thanks are extended to the many persons who have favored Professor Piper with their collections of Washington plants, especially Mr. Kirk Whited, of Wenache, Washington; Prof. R. M. Horner, of Waitsburg, Washington; Prof. J. B. Flett, of Tacoma, Washington, and Mr. M. W. Gorman, of Portland, Oregon.

For the privilege of examining their private herbaria Professor Piper is indebted to Mr. Thomas Howell, of Milwaukee, Oregon; to Mr. W. N. Suksdorf, of Bingen, Washington, and to Prof. L. F. Henderson, of Moscow, Idaho.

FREDERICK V. COVILLE,
Curator of the United States National Herbarium.

CONTENTS.

Page.

- Introduction 9
- The botanical explorers of Washington 10
  - Menzies 11
  - Lewis 11
  - Douglas 12
  - Scouler 13
  - Tolmie 14
  - Gairdner 14
  - Wyeth 14
  - Nuttall 14
  - Pickering and Brackenridge 15
  - Geyer 16
  - Spalding 16
  - Lyall 16
  - Jeffrey 17
  - Cooper 17
  - Collectors since 1860 17
- Physiography and geology 20
  - The Pacific Coastal Plain 20
  - The Olympic Mountains 21
  - The Puget Sound Basin 21
  - The Cascade Mountains 22
  - The Okanogan Highlands 24
  - The Columbia Plains 24
  - The Blue Mountains 26
- Climate 26
  - Precipitation 26
  - Sunshine and cloudiness 29
  - Temperature 30
    - Western Washington 30
    - Eastern Washington 31
  - Winds 32
- The Zonal distribution of Washington plants 33
  - Upper Sonoran life area 36
    - Origin of the Upper Sonoran flora 37
  - Humid Transition area 40
    - Uplands 41
    - Bottom lands 42
    - Gravelly prairies 42
    - Seashores 45
    - Sphagnum bogs 46
    - The Coastal strip 46
  - Arid Transition area 47
    - The Bunchgrass prairies 48
    - The Yellow Pine forests 50

The Zonal distribution of Washington plants—Continued. Page.
  Origin of the Arid Transition flora ... 51
    The Californian element ... 51
    The Rocky Mountain element ... 52
    The Columbia Basin element ... 52
  Comparison of the Humid and Arid Transition floras ... 53
  The Canadian zone ... 58
  The Hudsonian zone ... 60
  The Arctic zone ... 62
Regions of peculiar botanical interest ... 65
  The Olympic Mountains ... 65
  The Columbia Gorge ... 67
  Klickitat County ... 68
  Mount Stuart and the Wenache Mountains ... 68
  The Blue Mountains ... 71
Plants known to occur only in Washington ... 73
Plants which probably will be found to occur in Washington ... 75
Annotated catalogue of the species of vascular plants of Washington ... 76
  Addenda ... 613
Bibliography ... 615
Geographic index ... 619

ILLUSTRATIONS.

PLATES.

Facing page.
PLATE I. Giant cedars (*Thuja plicata*) ... Frontispiece
II. Topographic map of Washington ... 20
III. Characteristic vegetation of the bluffs along Puget Sound ... 21
IV. Steamboat Rock, in the Grand oulee ... 25
V. Rainfall map of Washington ... 28
VI. Sagebrush plains in Yakima County ... 36
VII. Forest of red fir (*Pseudotsuga mucronata*) in Washington ... 41
VIII. Characteristic view in a moist forest ... 41
IX. Pasture-like gravelly prairies of Pierce County ... 42
X. *Lupinus rivularis* on the gravelly prairies in Pierce County ... 43
XI. Prairie of bunchgrass (*Agropyron spicatum*) on the Horse Heaven Hills, Klickitat County ... 48
XII. Range lands near White Stone Lake, Okanogan County ... 48
XIII. View in a coulee near Lyons Ferry ... 49
XIV. Forest of yellow pine (*Pinus ponderosa*) ... 50
XV. Forest of yellow pine (*Pinus ponderosa*) ... 50
XVI. Forest of hemlock (*Tsuga heterophylla*) ... 58
XVII. Subalpine firs (*Abies lasiocarpa*) in Paradise Valley, Mount Rainier ... 60
XVIII. Vegetation of the Gorge of the Columbia River ... 67
XIX. Bunchgrass (*Agropyron spicatum*) growing on basalt outcroppings ... 146
XX. White hellebore (*Veratrum californicum*) ... 196
XXI. *Iris missouriensis* ... 202
XXII. *Lupinus ornatus* in low meadows near Wenas ... 355

MAP.

Map showing the floral areas of the State of Washington ... In pocket

FLORA OF THE STATE OF WASHINGTON.

INTRODUCTION.

The principal aim of the author in this work is to present a summary of our present knowledge of the vascular plants of Washington and to call attention to the more important problems, both taxonomic and ecological, which have become disclosed.

Simple keys to the genera and species are inserted so as to give the work a wider usefulness.

The nomenclature aims to follow the recently proposed Philadelphia Code. In accordance with the rules of this code in the matter of generic names, it is not improbable that several of those here used will have to be changed when the necessary bibliographical researches have been made. As the important synonomy is here given with each species, there will be little difficulty in coordinating the name adopted with any other commonly used heretofore, or which may be proposed hereafter.

As regards the limitation of species the author has in the main adopted a rather conservative attitude. Some of the recently proposed species seem well founded even if the differences are slight. In other cases the species or subspecies seem to be based on too slight characters and are therefore unworthy of nomenclatorial recognition. As one's acceptance or rejection of a proposed species depends in part on personal judgment, and in part on the evidence available, attention is, in nearly all cases, called to those which the author rejects. In all such cases additional material, as well as careful field notes, is desirable for the better understanding of the forms in question.

In the matter of the tendency common at present to raise to generic rank what have heretofore been considered subgenera, the writer likewise takes a conservative attitude. It is at least doubtful if the very large number of new names thus occasioned does not more than counterbalance any advantage argued in favor of the practice. Certainly the carrying of the practice to such an extreme that genera are considered to be made up of species of similar habit, rather than to be based on structural characters, seems inadvisable. Neither does it impress one as a valid argument that, because in some extremely natural families the genera must perforce be based on very slight differences, similar characters must be given equal consideration in all families.

The Pacific northwest is a region with great physiographic and correspondingly great climatic differences. In consonance with the physical factors there are many and striking peculiarities in the distribution of the plant species occupying this area, and the attempt is here made on the basis of the writer's familiarity with the region, and the recorded data of others, to determine some of the complex causes which have brought about the present plant distribution.

It is more than possible that some of the conclusions here reached or suggested may be based quite as much on our lack of knowledge as on definite information. While this may eventually prove to be the case, the suggestions here advanced may nevertheless serve as working hypotheses when a more complete botanical survey shall be undertaken.

Many of the data upon which the origin of the present flora of Washington depends must be sought to the southward, a region here considered only incidentally, but which must needs be more fully explored before certain conclusions here suggested can be either verified or overthrown.

THE BOTANICAL EXPLORERS OF WASHINGTON.

The following brief account of the botanical explorers of Washington refers to their labors mainly in so far as they concern the region covered by this work. Inasmuch as both Washington and Idaho were included in Oregon until 1853, many of the earlier collections in these States are ascribed simply to "Oregon," though Washington and north Idaho are sometimes referred to as "Upper Oregon," notably in Geyer's explorations. Before the name Oregon became attached to the northwest Pacific region the interior portions, especially south Idaho and eastern Oregon, were more or less vaguely included in "Upper California," a phrase not unusual on Douglas's plant labels, and quite frequently used in the Botany of Beechey's Voyage. Still earlier than this the name "New Georgia" was employed, mainly for the region bordering Puget Sound and the Gulf of Georgia. The most vague term of all, "Northwest Coast," has been made by different writers to include everything from the northern boundary of California to Prince William Sound, Alaska, and the approximate meaning of this phrase can be gleaned in each case where used only by indirect means.

The botanical explorations of Washington are conveniently grouped into two periods. The first of these includes all the explorers previous to 1860, namely, Menzies, Lewis, Douglas, Scouler, Tolmie, Gairdner, Wyeth, Nuttall, Pickering and Brackenridge, Geyer, Spalding, Jeffrey, Cooper, and Lyall. Besides these may be mentioned Moçino, who botanized at Nootka Sound, Vancouver Island, in 1792, and Thaddeus Haenke, who was at the same place in 1791. Nootka Sound, an important harbor in early times, was also visited by Menzies and by Scouler, and consequently is the type locality of many northwestern species.

MENZIES.

Archibald Menzies (1754–1842) was the surgeon and naturalist with Vancouver during his explorations from 1790 to 1795, during which time a thorough exploration was made of Puget Sound and adjacent waters, and of the Columbia River as far up as the site of Fort Vancouver. Previous to this time Menzies had already visited the "Northwest Coast" in a trading vessel and had made some collections. Sets of his plants are at Kew and in the British Museum. A very few are in the Gray Herbarium. In descriptions, Menzies's plants are commonly ascribed to the "Northwest Coast," or to "New Georgia." A considerable number are definitely known to have been collected at Nootka Sound, and it would perhaps be possible to ascertain the exact source of most of them.

LEWIS.

In conjunction with William Clark, Meriwether Lewis (1774–1809) made the famous transcontinental exploration in 1804–1806. All of his botanical collections that concern Washington plants were made on the return trip in 1806, and it has been possible from the labels on the specimens and the detailed journals of the expedition to determine accurately where each specimen was gathered. Most of these which concern Washington plants were collected, or described, from Fort Clatsop, near Astoria, Oreg.; at the Cascades, or "Grand Rapids" of the Columbia; at "Fort Rock Camp," or The Dalles of the Columbia; at Camp Chopunnish, on the Clearwater, opposite the present town of Kamiah, Idaho, and at "Quamash Flats," now Weippe Prairie, Idaho. Lewis's plants were described by Pursh in 1814 in Flora Americae Septentrionalis. A nearly complete set of his specimens is in the Philadelphia Academy of Sciences. A few of these are Pursh's actual types, but most of them are duplicates. A curious fact pointed out by Coues is that whenever Lewis described a plant in detail in his journal he rarely collected a specimen. This is notably true of the trees in the vicinity of Fort Clatsop, which Lewis described with considerable care. Rafinesque afterwards gave botanical names to these trees, based wholly on Lewis's descriptions.

DOUGLAS.

David Douglas (1799–1834), a Scotch botanist sent out by the London Horticultural Society, made extensive collections in two journeys, the first from 1824 to 1827. In this journey Douglas explored the larger portion of what is now Washington and much of Oregon and Idaho. He returned to England in 1827, traveling overland from Fort Vancouver to Hudson Bay, where he fortunately found a whaling vessel. The second journey occupied the years 1830 to 1833. The summer of 1830 was spent in Washington and Oregon. From December, 1830, to October, 1832, he was in California and the Hawaiian Islands, whence he again reached the Columbia River October 23, 1832. The ensuing twelve months were spent in Washington and Oregon. October 18, 1833, Douglas sailed from the mouth of the Columbia to the Hawaiian Islands, where he met his death July 12, 1834.

During all of his trips Douglas kept a journal, and this is now in the possession of the London Horticultural Society. The principal parts of this journal were published after Douglas's death in the "Companion to the Botanical Magazine," by Sir W. J. Hooker, in 1836. This paper has recently been reprinted by the Oregon Historical Society. From it the following epitome of Douglas's northwestern explorations are drawn:

Reaching Fort Vancouver April 19, 1825, Douglas spent the first two months collecting in the immediate vicinity. From June 20 to August 5 he botanized along the Columbia between Vancouver and The Dalles. On August 19 he started up the Willamette, reaching a point 38 kilometers (24 miles) above the falls. The second week in September he ascended the high mountains on each side of the Columbia, a very arduous task. On the mountain on the south side, he discovered *Abies amabilis* and *A. nobilis*. The time from October 22 until November 15 was spent in a trip to the mouth of the Columbia, thence up the coast to Willapa and Gray harbors. From the latter place he ascended the Chehalis River and returned to Vancouver down the Cowlitz. Owing to extremely bad weather, all the collections of this trip were lost. The winter was spent at Fort Vancouver.

March 20, 1826, Douglas started for Fort Walla Walla, now the site of Wallula, which he reached on the 28th. April 1 he was at Priest Rapids, April 6 at the mouth of the Okanogan, and April 11 at the mouth of the Spokane, where he remained eight days. April 19 he started for Kettle Falls, where much of the time until June 4 was spent. Proceeding overland to Walla Walla, he remained there until June 19. During the three weeks succeeding he made two trips into the Blue Mountains. On July 17 he started up the Snake River, reaching the mouth of the Clearwater July 24. Douglas collected about the present site of Lewiston and in the adjacent Craig Mountains until the 30th. July 31 he started overland for Kettle Falls, which he reached August 4, going by way of Old Fort Spokane. Here he remained until the 18th, when he proceeded to Fort Okanogan on horseback, thence down the Columbia, reaching Vancouver August 31. The remainder of this season was spent in a trip to the head of the Umpqua River, where he discovered the sugar pine, near the present site of Roseburg. On March 20, 1827, he started for England, going up the Columbia to Kettle Falls on foot. From here he made his way across the continent to Hudson Bay, whence he sailed in a whaling ship.

On Douglas's second journey he reached the Columbia June 3, 1831. Most of this season was spent in the Blue Mountains region, where he collected " one hundred new species " of plants. From October 10 until December 23 he was at the mouth of the Columbia. From then until October 23, 1832, he was in California and the Sandwich Islands. Reaching the Columbia again October 23, 1832, he spent the fall collecting mosses and seaweeds along the coast. In the spring of 1833 he again ascended the Columbia, reaching Fort Okanogan April 9. The early part of the summer was spent on Fraser River, but all his collections were lost by the upsetting of his canoe, and Douglas barely escaped with his life. July 15, 1833, he was again at Walla Walla, whence he made excursions for the third time into the Blue Mountains. October 18, 1833, he sailed from the mouth of the Columbia. The extent and amount of this man's collections during the three seasons he spent in the Northwest almost surpass belief.

His collections are described in Hooker's Flora Boreali-Americana. A few of his duplicates are in the Gray Herbarium, but the most complete set is at Kew.

SCOULER.

Dr. John Scouler (1804-1871) was the companion of Douglas on his first journey. His collections were confined to the single season of 1825. During April and May he collected with Douglas mainly at the mouth of the Columbia and at Fort Vancouver. From June until September Scouler spent on a trip to Nootka Sound and return, during which he is said to have visited nearly every harbor along that stretch of coast. Some of his specimens are labeled "Straits of de Fuca;" others " Nootka Sound." The best set is in the British Museum. Scouler's manuscript journal is in the possession of the Oregon Historical Society and, it is stated, will soon be published.

TOLMIE.

Dr. W. F. Tolmie (died in 1886) went to Fort Vancouver in 1832 as a medical officer to the Hudson Bay Company. He had been a pupil of Sir W. J. Hooker, to whom he sent many botanical specimens. Tolmie's duties caused him to travel quite widely in the Northwest, but little is known of the details of his journeys. He was the first botanist to visit Mount Rainier, on the slopes of which he collected in 1837. Tolmie's specimens are mostly labeled "Fort Vancouver," "Multnomah River," and "N. W. Coast." Many specimens collected in the "Snake country" of south Idaho and described in the Botany of Beechey's Voyage, are usually accredited to Tolmie, though he expressly states that they were gathered for him by a friend.

GAIRDNER.

Dr. Meredith Gairdner, a surgeon of the Hudson Bay Company, collected a few plants about Fort Vancouver, where he died prior to 1840. His specimens are at Kew. *Carum gairdneri*, the finest food plant of the northwestern Indians, commemorates his name.

WYETH.

Nathaniel Wyeth, the adventurous and enterprising American traveler and trader, crossed the continent on his first journey in 1832. On his return trip in 1833 he crossed the mountains in north Idaho, and made a small collection of plants on the Flathead River. These were described by his friend, Nuttall, in the Journal of the Philadelphia Academy of Sciences, new series, volume 7. Wyeth's journals were published in 1889 by the Oregon Historical Society.

NUTTALL.

Thomas Nuttall (1786–1859), an Englishman by birth, one of the most acute and able of American botanists, spent the years 1834 to 1836 botanizing in the West. He was a member of Wyeth's second expedition, crossing the continent by the "Oregon Trail." He reached Fort Walla Walla about September 3, 1834, and Fort Vancouver September 16. On the overland trip Nuttall collected a very large number of species, considering the circumstances. December 11 he sailed for the Sandwich Islands, returning to the Columbia the following spring. His headquarters during 1835 were on Sauvie Island, at the mouth of the Willamette River, then called Wappatoo Island. Nuttall made but few and short excursions from his base, apparently finding enough to occupy his energies there. He did, however, collect about the Willamette Falls, Fort Vancouver, and the mouth of the Columbia. His original collection is in the British

Museum, but good sets of his specimens are in the Gray and Torrey herbaria, and many others are in the Philadelphia Academy of Sciences.

PICKERING AND BRACKENRIDGE.

Dr. Charles Pickering and Mr. W. D. Brackenridge were the botanists of the exploring expedition under Commodore Wilkes. Their botanical explorations so far as Washington is concerned were briefly as follows: May 2, 1841, the expedition was at Port Discovery, remaining there until the 6th instant. On the trip up Puget Sound stops were made at Appletree Cove and Port Madison. The expedition reached Fort Nisqually May 11, which place became the headquarters for the explorations in the interior. Pickering and Brackenridge were attached to Lieutenant Johnson's party, which left Nisqually May 20 and crossed the Cascade Mountains by way of the Indian trail up White River. They reached the summit on the 26th instant, remaining there two days, descending on the east side down the Spipen or Naches River. Leaving this river near its mouth the party traveled northward to the Yakima and thence over the Wenache Mountains to the Wenache River. From here the route was up the Columbia to Fort Okanogan, which was reached June 8. June 10 the journey was resumed eastward up the Columbia, and Fort Colville was reached June 15. From Fort Colville the party traveled southward, reaching Lapwai, Idaho, on June 25. A two days' trip from here brought the party to Fort Walla Walla, where they remained until July 4. From here their route led up the Yakima and Naches rivers and thence over the mountains by the outgoing route.

Several other exploring parties were also sent out from Nisqually, but the only botanical specimens collected by the expedition seem to have been gathered by Pickering and Brackenridge.

The results are included in two of the large volumes devoted to the scientific results of the expedition. Unfortunately the original labels of the specimens seem in some way to have become intermixed, with the result that a good many plants confined to eastern Washington bear such labels as "Port Discovery" and "Nisqually," while other species confined to western Washington are labeled "Walla Walla," or "North Fork of the Columbia." On some sheets eastern and western Washington species are mixed, and mounted over a single label. With the details of the party's itinerary known, it is possible, however, to tell with some accuracy where the specimens must have been gathered.

GEYER.

Charles A. Geyer, a German botanist who had previously botanized extensively in Illinois, and who later was attached to Nicollet's expedition, traversed the continent with a party of missionaries, and in November, 1843, crossed a high spur of the "Green" (Bitterroot) Mountains from the Flathead to the Spokane or Cœur d'Alene River, and passed the winter at Chamokane Mission, situated on Chamokane Creek, about 10 miles from its junction with the Spokane. During the season of 1844 Geyer made excursions northward to Old Fort Colville on the Columbia, southeastward up the Spokane River and into the mountains about Lake Cœur d'Alene, and southward to the Palouse River and to Lapwai Mission, near the mouth of the Clearwater. From here he explored the Craig Mountains of Idaho. Journeying overland to Fort Walla Walla he descended the Columbia, and reached Fort Vancouver November 13, 1844, whence he sailed to England.

Geyer's account of the flora of the regions explored by him is remarkably good. A nearly complete set of his plants is in the Gray Herbarium.

SPALDING.

Rev. Henry Spalding was a missionary to the Nez Perce Indians and founder of Lapwai Mission near the mouth of the Clearwater River, Idaho. In this vicinity Spalding collected a good many plants which are in the Gray Herbarium. Most of them are labeled "Clearwater, Oregon," but inasmuch as a number of them have not since been found near Lapwai it is not improbable that they were collected elsewhere. Spalding traveled quite extensively in the course of his labors, and doubtless gathered some of his specimens at other places than Clearwater, as, indeed, some few of the labels indicate. His notes on the Indian food plants are most interesting and often quite detailed. According to the testimony of his son, the late H. H. Spalding, the specimens were largely gathered by his mother.

LYALL.

Dr. David Lyall was the surgeon and botanist attached to the International Boundary Survey. His work, so far as it relates to Washington, was during the years 1858 to 1860, inclusive. During 1858 he made collections on Vancouver Island and on the smaller islands and the mainland near the forty-ninth parallel. In 1859 the western slopes of the Cascades near the boundary were explored. In 1860 the surveyors went up the Columbia, dividing at The Dalles into two parties. One party, which Lyall accompanied, traveled in a northerly direction, past Fort Simcoe, across the Naches and other tributaries of the Yakima, thence over the Wenache Mountains to the Columbia, which was reached just below the mouth of the Wenache. From here the party followed the Columbia and Okanogan to Lake Osoyoos. Following up the Similkameen and Ashnola the party formed a camp at 1,670 meters (5,480 feet) elevation on the boundary, where they remained some time.

The other party proceeded to Fort Walla Walla and thence northward, crossing the Snake at the mouth of the Palouse and passing Rock Lake on the route to Fort Colville. The collections of this party were made by John Buttle, but the specimens seem all to be credited to Lyall. During the year 1860 the survey was completed nearly to the Idaho line.

Lyall's account of his botanical observations is brief, but very interesting. A nearly complete set of his plants is in the Gray Herbarium.

JEFFREY.

John Jeffrey, a Scotch botanist, was sent out by some patrons to collect the seeds of plants of horticultural interest in the region traversed by Douglas, " to complete his researches, and to extend them into those parts of the country not fully explored by him." Jeffrey was at Fort Colville May 13, 1851, reaching that point from the northward. During this season he spent much of the time in northern Washington and adjacent British Columbia. Late in the season he was on Mount Baker. In May of the following year Jeffrey was at Fort Nisqually, and during June and July at Fort Vancouver. His remaining explorations were all southward.

Very little is known of Jeffrey's specimens, as none exist in American herbaria, and but little has been published concerning them.

COOPER.

Dr. J. G. Cooper collected in various portions of Washington from 1853 till 1855, in connection with the Stevens Survey of the forty-eighth parallel. An annotated list of his plants, including also some collected by Dr. George Gibbs and Dr. G. Suckley, is published in the Pacific Railroad Reports, volume 12, part 2.

COLLECTORS SINCE 1860.

Among botanical collectors since 1860 none has done more to explore the flora of the State than Mr. W. N. Suksdorf, of Bingen, who for twenty-five years past has been an assiduous student of plants. His most important collections have been made in Klickitat County, but he has gathered much material also in Spokane and Whatcom counties, and elsewhere. Sets of his plants are in all the principal herbaria, while his private collection is among the best in the Northwest.

Mr. Thomas Howell, whose long and extensive labors have mainly been limited to Oregon, has nevertheless collected much in Washington, especially in the counties bordering on the Columbia. Mr. Howell's herbarium is now in the possession of the Oregon State University, but sets of his plants are widely distributed. A considerable collection of Klickitat County plants was also made by Mr. Joseph Howell.

Professor L. F. Henderson, who has also collected much in Oregon, gathered rich material in the Olympic Mountains in 1890, and in 1892 traveled over much of the State to make a collection for the Columbian World's Fair. This is now in the State University at Seattle. Professor Henderson's private herbarium, one of the most complete in its representation of North Pacific plants, was unfortunately burned in the recent fire that destroyed the main building of the University of Idaho.

Mr. T. S. Brandegee, Mr. Frank Tweedy, and Prof. E. W. Hilgard were associated with the North Transcontinental Survey organized in connection with the Northern Pacific Railway under Villard's presidency. In connection with this work extensive collections were made, especially by Brandegee, in Walla Walla, Yakima, and Kittitas counties. The best set of these plants is in the Canby Herbarium, now in the New York College of Pharmacy.

Dr. Sereno Watson visited Washington in 1880 in connection with the Tenth Census Survey of the forests. He made small collections at Yakima Pass, Lake Chelan, Fort Colville, and Spokane. The specimens are in the Gray Herbarium.

Charles A. Ramm collected a small set of plants in 1883 in Spokane County, which were sent to Doctor Gray.

Mr. George R. Vasey made extensive collections for the Department of Agriculture in 1889, principally in Yakima, Kittitas, and King counties. Sets of his plants are in the principal herbaria. His specimens, unfortunately, lack data regarding their exact place of collection.

Mr. F. Binns collected plants from 1888 to 1890 about Port Ludlow, and sent them to the Gray Herbarium.

Rev. Ernest C. Smith botanized in the vicinity of Seattle in 1889 and 1890, in the latter year making collections on Mount Rainier.

Dr. E. L. Greene collected in 1889 about Clealum, Yakima, and on Mount Rainier.

Mr. J. M. Grant sent a few plants to the Gray Herbarium, collected in the Olympic Mountains in 1889.

Mrs. Susan Tucker made collections near Cheney in 1889, and again in 1903.

Prof. E. R. Lake and Mr. W. R. Hull collected in 1892 in the Blue Mountains, and later in Douglas and Chelan counties.

Messrs. Sandberg and Leiberg, collecting for the Department of Agriculture, botanized along the Great Northern Railway from Spokane to the summit of the Cascade Mountains in 1893. Their collections are very large and valuable. During the preceding year these same botanists, together with Dr. D. T. MacDougal and Mr. A. A. Heller, collected in Latah and Nez Perce counties, Idaho, incidentally gathering plants at a few adjacent points in Washington.

Prof. J. B. Flett has been active in studying the flora of the State since 1895. He has made extensive collections in the Olympic Mountains, on Mount Rainier, about Tacoma, in Island County, and in the Mount Adams region.

Mr. O. D. Allen during the year 1895, and subsequently, has prepared exquisite sets of specimens from the region about Mount Rainier. His plants are in all the leading herbaria.

Mr. A. D. E. Elmer botanized in 1896 in Whitman County; in 1897 in Okanogan and Kittitas counties; in 1898 about Mount Stuart, and in 1900 in Clallam County. His specimens are in many herbaria.

Prof. R. M. Horner made fine sets of the plants of the Blue Mountains in 1896 and 1897. A complete set of his plants is in the National Herbarium.

Mr. N. L. Gardner collected in 1897 and 1898, mainly about Coupeville.

Mr. M. W. Gorman secured a fine set of plants in the Washington Forest Reserve in 1897 for the National Herbarium. He has also collected in Klickitat County and elsewhere.

Mr. F. H. Lamb collected in 1897 in the little known region northward from Grays Harbor. Several herbaria have sets of his plants.

Mr. A. A. Heller made sets of specimens in 1898 from the vicinity of Montesano. They have been distributed to the leading herbaria.

Mr. Kirk Whited has for several years past made large collections in Kittitas and Chelan counties, adding much to the knowledge of that interesting region.

Mr. John S. Cotton has made very extensive collections in central Washington since 1900, mostly in Yakima County. In 1902 he collected in company with Dr. David Griffiths.

Mr. Frank O. Kreager collected sets of plants in Stevens and Spokane counties in 1903, and the flora of the same region has been further explored by Prof. R. K. Beattie and Ronald Chapman in 1904.

Mr. H. C. Conrad made valuable collections in 1903 on the Quinault Indian Reservation of Chehalis County.

Dr. Ruhn, U. S. Army, gathered specimens about Muckleshoot Prairie, King County, and sent them to Doctor Gray. The labels bear no dates.

Others have made smaller collections of plants in the State. Their names appear in association with the specimens they gathered.

The writer's personal observations and collections have been made in many parts of the State. Especially extensive collections were made about Seattle, 1885–1892; Mount Rainer, 1888 and 1895; Olympic Mountains, 1890 and 1895; Union City, 1890; Pullman and vicinity, 1893–1903; Blue Mountains, 1896. The earliest of these collections are in the herbarium of the State University at Seattle; the remainder are at Pullman, in the State College of Washington. The herbarium of the State College, which more than any other is the basis of this work, contains about 40,000 sheets of Washington plants, including very full sets of the Washington collections of Howell, Henderson, Suksdorf, Vasey, Sandberg and Leiberg, Gorman, Flett, Whited, Horner, Lake and Hull, Allen, Elmer, Gardner, Lamb, Heller, Cotton, Cotton and Griffiths, Kreager, Mrs. L. A. Bouck, Beattie and Chapman, and Conard. A nearly complete set of the writer's own collections, including the types of his new species, is deposited in the National Herbarium.

PHYSIOGRAPHY AND GEOLOGY.

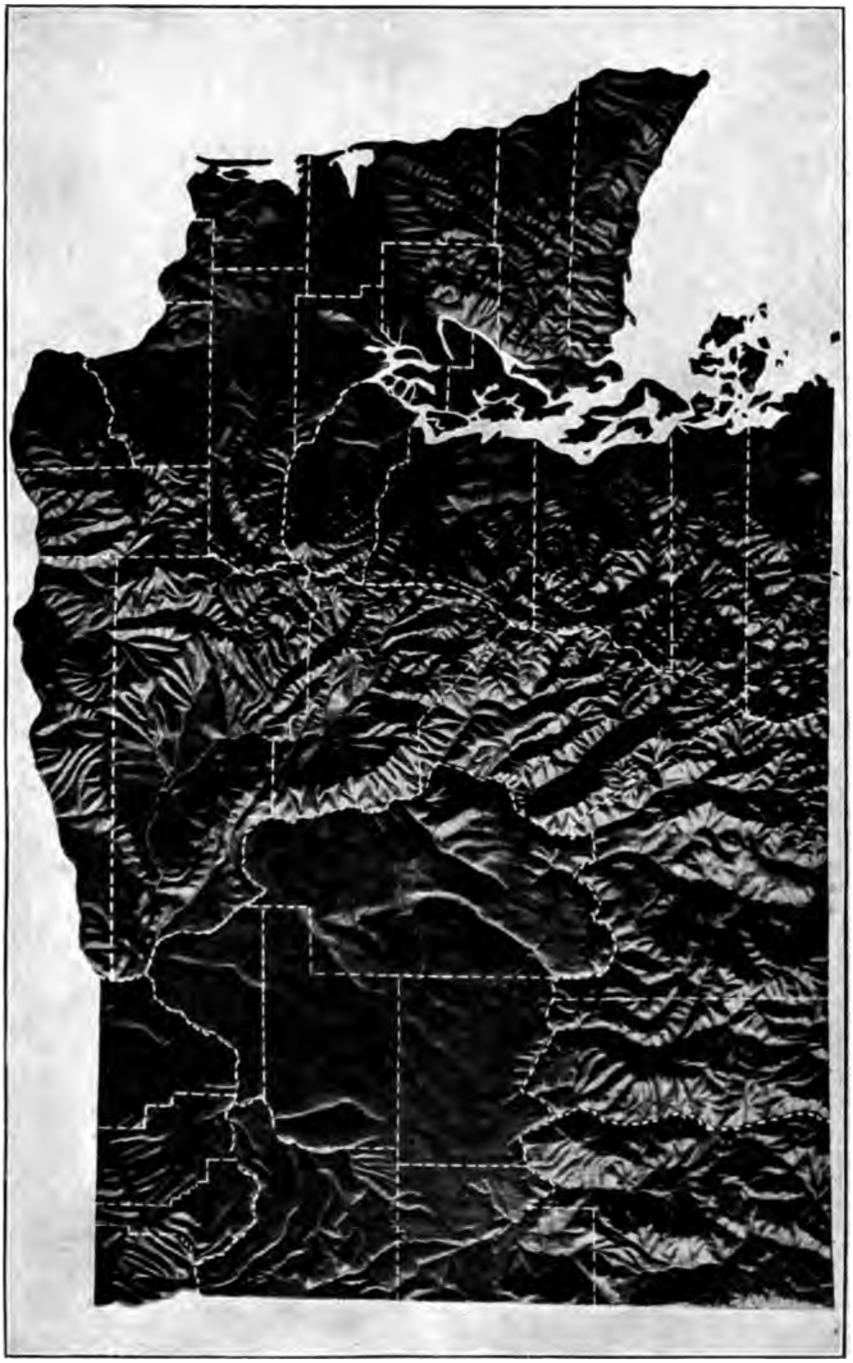
The accompanying relief map (Pl. II) will render clear the principal physiographic features of the State of Washington. It may conveniently be considered to be made up of seven regions, namely, the Pacific Coastal Plain, the Olympic Mountains, the Puget Sound Basin, the Cascade Mountains, the Columbia Basin, the Okanogan Highlands, and the Blue Mountains.

THE PACIFIC COASTAL PLAIN.

This is a narrow strip of land in immediate proximity to the Pacific Ocean and the Straits of Juan de Fuca. It is watered by numerous short streams from the Olympic Mountains and from the low Coast Mountains in Chehalis and Pacific counties. The largest stream, the Chehalis River, rises in the Cascade Mountains, and its valley connects the coastal plain with the Puget Sound Basin.

The formation of most of the land is quite similar to that of the Puget Sound Basin, described below. The distinctive features are, first, the low strip of sandy land, seldom over a mile wide, formed by the inland drifting of the ocean sand; second, the steep rocky bluffs which face the ocean at the mouth of the Columbia River and in a few places near Cape Flattery, and third, the coastal plain proper. This region is characterized by having a very great rainfall, ranging from 200 to 300 centimeters (80 to 120 inches) annually.

PLATE II.



TOPOGRAPHIC MAP OF WASHINGTON.

From the original model by Professor Solon Shedd, State College of Washington.

In its late geological history the region was covered by great glacial deposits derived mainly from the adjacent mountains. These deposits consist of clay, gravel, or sand, often somewhat stratified. Pure deposits of each 30 meters thick or more are common. The total thickness of the glacial deposit has been estimated at from 150 to 300 meters.

The whole region is densely timbered with the exception of a series of small gravelly plains. These are largest and most abundant in the central part of the basin, but similar ones occur near Vancouver, and on Whidby and other islands. Likewise the tips of many of the points projecting into Puget Sound have the same gravelly soil, accompanied by a characteristic flora and fauna. These gravelly prairies are plainly formed by flowing water, and are generally considered to be deposited by post-glacial streams. Very similar prairies occur along the Willamette Valley. They form, indeed, an interrupted series from the middle part of that valley northward to Vancouver Island. Owing to the very gravelly soil of these prairies, they partake of a semiarid condition. Indeed, the flora contains many species identical with those of eastern Washington.

The drainage of the basin is mainly into Puget Sound, the principal rivers coming from the Cascades, but the Cowlitz River and various smaller streams in the extreme southern part of the basin, flow into the Columbia.

These streams for the main part originate in glaciers, and all of them have formed rather narrow valleys largely of glacial detritus.

THE CASCADE MOUNTAINS.

These mountains vary in breadth from 100 to 125 kilometers (80 to 100 miles), traversing the State in a course a little easterly of a true north direction. The altitude of the main uplift varies from 1,800 to 2,100 meters (6,000 to 7,000 feet). The important peaks which conspicuously exceed this altitude are Mount Baker, in Whatcom County, altitude 3,335 meters (10,825 feet); Glacier Peak, Snohomish County, said to be 3,214 meters (10,436 feet) high; Mount Stuart, Kittitas County, 2,903 meters high (9,479 feet); Mount Rainier, on the dividing line of Pierce and Thurston counties, the highest peak of the Cascade system, 4,475 meters high (14,530 feet); Mount Adams, Klickitat County, altitude 3,819 meters (12,401 feet), and Mount St. Helens, Skamania County, 2,947 meters high (9,570 feet). These tall peaks are all capped with perpetual snow, and rise far above the limits of ordinary plant life. With the exception of Glacier Peak and Mount Stuart they are all volcanic cones.

The Cascade Mountains form the most important topographical feature of the State as affecting the distribution of plant life. The prevailing southwest winds from the Pacific are by them deprived of most of their moisture, the result being that the region to the eastward is not only much drier, even to semidesert conditions in limited areas, but also much warmer in summer. The plants and animals adapted to such conditions are necessarily very different, as a rule, from those that thrive in the moist region to the westward.

It is very clear that the Cascades serve as a barrier, primarily because of the difference in humidity eastward and westward which they occasion, and not because of their altitude. Many of the passes over these mountains are but a little over 1,000 meters in altitude, not sufficiently high even in this period to prevent many plants from migrating through, especially in the wake of forest fires. As a matter of fact the rainfall influences the vegetation for a considerable distance down the eastern slopes of the mountains, the flora of the main range down to about 1,000 meters altitude being largely composed of species of the coast region.

In Washington proper no stream traverses the Cascade Mountains, but on the southern border is the great gap through which the Columbia River flows. This enormous gorge gives rise to peculiar local conditions, which find marked expression in the flora. Through this gap, too, the coastal flora, aided by the prevailing upstream humid winds, penetrates farther eastward than usual. Still, at the village of White Salmon there is an unmistakable dividing line between the humid and the semiarid floras.

Nearly all of the many streams that arise in the Cascades flow through deep gorges, once occupied by glaciers. Indeed, many of the streams, especially those heading about the higher peaks, still find their birth in glaciers.

The Cascade range north of the forty-seventh parallel is composed largely of granite and other metamorphic rocks. Mount Rainier and the entire range southward to its extremity in northern California is on the contrary almost entirely made up of volcanic rocks. Recent investigations in the geology of these mountains disclose in part a very complex history, but indicate that the principal uplift took place either in late Pliocene or early Pleistocene time, and subsequent to the great outpourings of lava that make up most of the region between the Cascades and the Rockies.

From a biological point of view the changes brought about by the Cascade uplift were profound. Undoubtedly it transformed the climate of the region to the eastward from one relatively moist to one distinctly arid, and at the same time increased greatly the humidity of the region to the westward. This climatic change, particularly in the interior, must have been accompanied by a correspondingly great change in the flora. The peculiar make-up of the Columbia Basin flora of the present time indicates with more or less clearness some of the resultant effects of the Cascade uplift.

THE OKANOGAN HIGHLANDS.

These mountains occupy the northeast portion of the State, including most of Stevens and Ferry counties. To the southward they pass gradually into the Columbia Plains. To the westward they are naturally limited by the Okanogan River.

The Okanogan Highlands consist mainly of gently rounded hills, rising into peaks 1,500 to 2,000 meters high. Geologically they are similar to the northern part of the Cascades, and are composed largely of granite. The vegetation is nearly identical with that of the eastern slope of the Cascades. These mountains and those of British Columbia connect the Cascade system with the Rocky Mountain system in Idaho. In consonance with the markedly similar conditions of soil and climate it is not surprising that a number of species of the coast region occur through these mountains and in north Idaho.

THE COLUMBIA PLAINS.

The greater portion of eastern Washington is covered by an immense mass of basalt, of an average thickness of at least 1,300 meters. This mass is the result of a series of lava overflows which involved not only eastern Washington but also great portions of eastern Oregon and Idaho, covering in all an area of over 500,000 square kilometers (200,000 square miles). Geologically this is known as the Columbia River basalt. It covered in Washington all of the region south of the Okanogan Highlands and extended westward from the Bitterroots nearly to the present crest of the Cascade Mountains and beyond this at least in Clarke and Cowlitz counties. The canyon walls of Snake River and other streams indicate a number of successive overflows, at least ten, between some of which sufficient time elapsed for soil to form and forests to grow. The remains of the latter appear either as charcoal embedded in the soil of old lake bottoms, or else as silicified trunks, these often remaining in their original vertical positions.

Originally the surface of the lava appears to have been approximately level, but subsequent to the last great overflow a large lake or else a series of lakes existed in Yakima, Douglas, Klickitat, and Franklin counties as well as in adjacent Oregon. This was Lake John Day. Whether this lake merely filled a basin formed beyond the heads of the last lava flows, or whether it was formed through the sinking of the surface concomitantly with the commencement of the uplifting of the Cascade and Blue mountains is not clear.

The deposits formed in the bottoms of Lake John Day consist of soft sandstone and conglomerates which have largely been removed by subsequent erosion. The light, ashy soils formed from these deposits are very different from the heavy clay loam formed by the disintegration of basalt.

In some of the John Day rocks remains of plants and animals are found which long since have become extinct. These belong to Miocene-Tertiary time and indicate the existence of a rich and varied flora, strikingly different from that which occupies the region to-day.

The surface of the Columbia River basalt averages about 700 meters in elevation. Subsequent to its formation occurred the uplifting of the Cascade and Blue mountains. Since that time the geological history of the region has been mainly one of erosion.

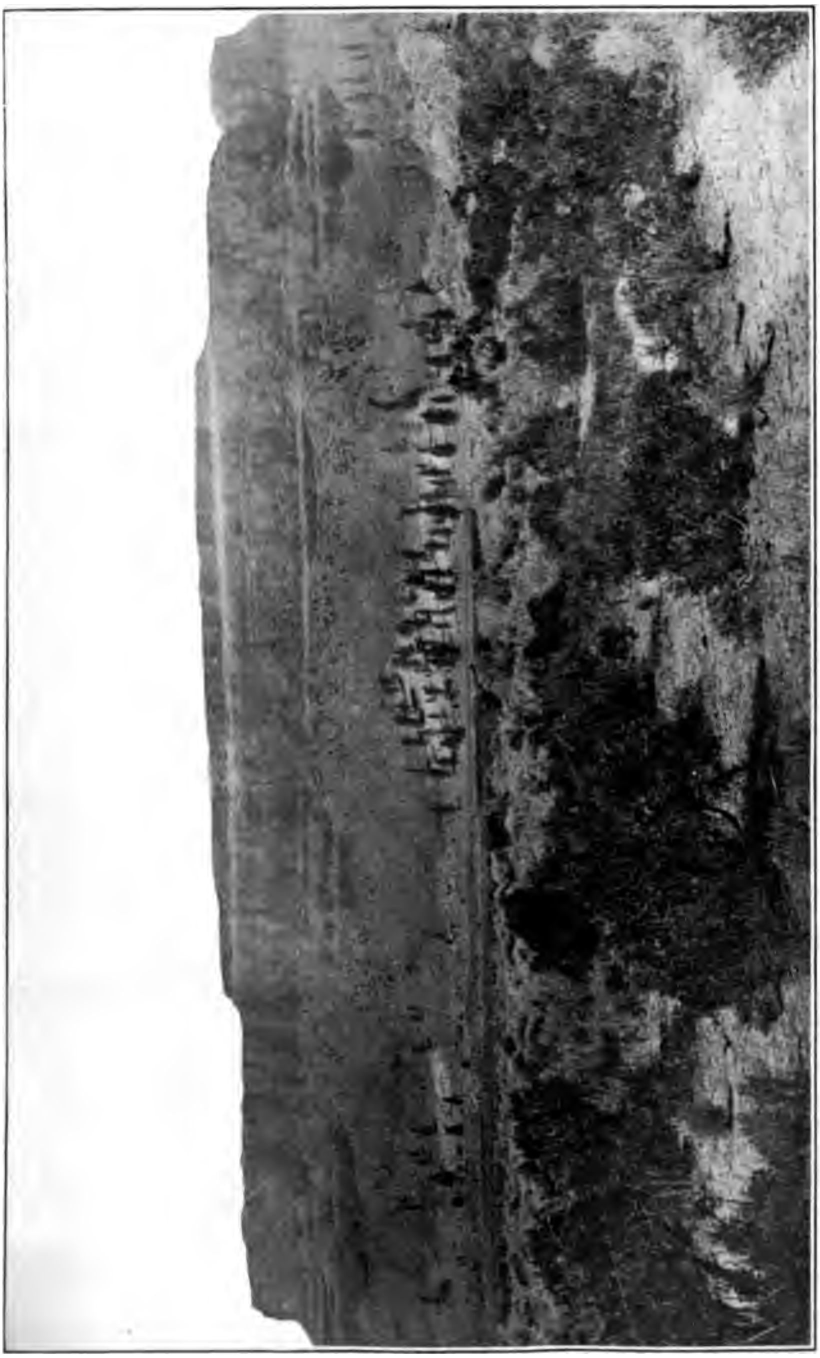
Owing to the soft character of the basalt the principal rivers have worn great canyons in it along their courses. Thus Snake River where it enters the State flows in a tremendous gorge 600 meters deep, this gradually lessening to the westward. Where this river cuts through the Blue Mountains between Washington and Idaho it exposes 1,300 meters of basalt rock, which is supposed to represent about the original thickness of the combined lava overflows.

The Columbia River for a great portion of its course has followed close to the line of contact between the basalt and the older granitic rocks. In places its canyon is almost as impressive as that of Snake River.

Besides the canyons now occupied by streams, there are many others, the abandoned courses of ancient rivers, called coulees. The most notable of these are Grand Coulee (Pl. IV) and Moses Coulee in Douglas County, 200 to 300 meters deep. These two coulees were originally enormous cracks in the basalt, and have since been greatly eroded. The bottom of the first named is occupied by a nearly continuous chain of lakes.

The glacial period has left but small traces of its work in eastern Washington outside of the mountains. During this time the canyons of the Snake River and the Columbia were filled to a depth of about 100 meters with gravel, most of which has since been removed. The upper Spokane Valley is, however, still composed of such glacial detritus. No evidence of glaciation exists, however, on the surface of the basalt plateau, excepting in the northern part of Douglas County, where glaciers crossed the Columbia, thus blocking it and causing the waters to find a temporary new channel through the Grand Coulee.

Apparently the gorge of the Columbia River through the Cascade Mountains was blocked at this same time, resulting in the formation of a great glacial lake, called Lake Lewis. This seems to have occupied practically the same area as its ancient predecessor, Lake John Day. Except for ill-defined beaches at an elevation of 420 meters and occasional erratic bowlders scattered over Yakima and Douglas counties and doubtless dropped by icebergs, there is little left to show the existence of this lake.



STEAMBOAT ROCK, IN THE GRAND COULEE.

The large plants in the foreground are greasewood (Sarcobatus vermiculatus), those in the middle distance are sagebrush (Artemisia tridentata), with yellow pine (Pinus ponderosa) on the talus slope.

Rainfall records.

Station.	Altitude in feet.	Length of record in years.	Average annual precipitation in inches.
Aberdeen	162	14	88.55
Anacortes	75	11	29.41
Ashford	1,775	8	71.81
Bellingham	60	10	31.93
Blaine	75	8	43.91
Bremerton	15	4	53.60
Brinnon	80	6	76.15
Cedonia	3,000	11	20.39
Centralia	212	11	46.41
Cheney	2,351	6	17.14
Clearbrook	140	12	47.11
Clearwater	135	9	131.01
Clealum	1,930	6	28.73
Colfax	2,300	12	23.96
Colville	1,635	5	17.47
Conconully	2,150	5	16.20
Coupeville	78	9	22.49
Crescent	2,150	5	18.67
Danville	1,749	1	13.97
Dayton	1,450	16	24.86
East Sound	--------	10	31.72
Ellensburg	1,577	17	9.52
Ephrata	1,265	1	6.03
Fort Simcoe	1,400	15	9.30
Grand Mound	162	9	52.60
Granite Falls	397	5	60.07
Hooper	1,083	3	13.11
Horse Heaven	--------	1	8.92
Hunters	--------	5	20.38
La Center	250	8	51.26
Lakeside	985	14	12.63
Lind	1,700	8	11.75
Loomis	1,200	7	13.69
Lyle	600	12	25.11
Mayfield	300	9	65.90
Mottinger's Ranch	307	5	9.34
Mount Pleasant	650	5	59.39
Moxee	1,000	13	8.79
Neah Bay	50	20	109.37
Northhead	--------	1	50.53
Northport	1,950	6	19.41
Olga	50	15	30.60
Olympia	15	27	55.11
Pasco	360	1	5.74
Pomeroy	1,500	9	19.56
Port Crescent	259	10	46.28
Port Townsend	80	15	21.16
Pullman	2,500	13	22.77
Republic	2,628	5	20.23
Ritzville	1,825	6	7.01
Rosalia	2,300	13	20.89
Seattle	123	14	35.90
Sedro Woolley	38	8	48.94
Silvana	35	10	36.43
Snohomish	50	11	46.64
Snoqualmie Falls	667	4	64.76
South Ellensburg	1,570	11	9.29
South Bend	16	9	92.09
Spokane	1,913	24	18.23
Sprague	1,908	6	15.11

Rainfall records—Continued.

Station.	Altitude in feet.	Length of record in years.	Average annual precipitation in inches.
Sunnyside	764	10	6.63
Tacoma	213	19	44.63
Tatoosh	86	20	93.78
Trinidad	900	1	6.05
Twin	6	2	66.50
Twisp	1,619	1	18.50
Union City	10	11	83.41
Usk	2,050	5	24.80
Vancouver	50	31	38.74
Vashon Island	110	16	41.56
Walla Walla	1,000	19	16.77
Waterville	2,624	15	13.80
Wenache	1,169	6	15.52
Whatcom	60	9	31.93
Wilbur	2,203	6	16.20
Zindel	715	3	17.67
Lewiston, Idaho	757	11	13.82
Arlington, Oreg	855	14	9.11
The Dalles, Oreg	12	30	15.09
Umatilla, Oreg	340	17	8.84
Astoria, Oreg	50	45	87.41

The rainfall map (Pl. V) is based mainly on the above records, but over mountainous regions where no records have been made the lines drawn are based on topography. Owing to the great variation in rainfall caused by mountains and to a less extent by deep canyons, which often make great differences within small areas, the rainfall map is drawn on broad lines. Enough is known of these local differences in rainfall caused by topography to make it certain that an accurate map of Washington to show these smaller differences would be a very complex affair.

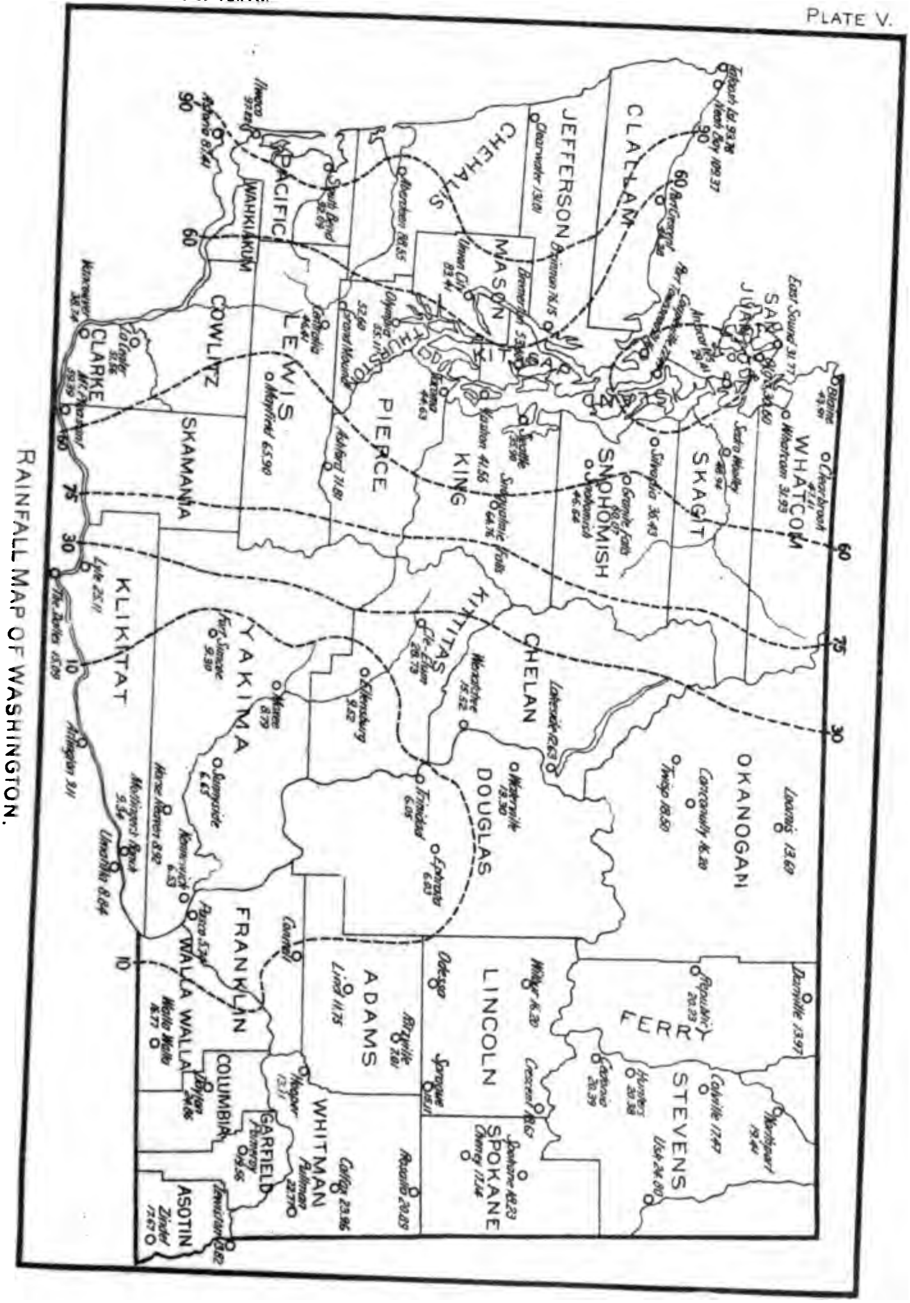
The larger differences in the normal annual precipitation are clearly shown by the map. As a whole, western Washington has a heavy rainfall while that of eastern Washington is light. The coast region has the greatest precipitation, heaviest on the western slope of the Olympic Mountains. The region immediately to the northeast of these mountains has a correspondingly light rainfall. No satisfactory records are available for the precipitation in the higher parts of the Cascade Mountains. Presumably it is between 70 and 90 inches.

In eastern Washington perhaps the most striking feature is the suddenness with which the precipitation decreases east of the crest of the Cascades.

The area over which the rainfall is less than 10 inches is practically identical with the Upper Sonoran life area.

As compared with the rest of the United States the narrow strip immediately along the ocean has the maximum amount of rainfall,

PLATE V.



RAINFALL MAP OF WASHINGTON.

As regards temperature then the climate of this region is remarkably equable, without marked extremes in either summer or winter. The region in immediate proximity to the ocean has the coolest summer, and the extreme winter temperatures have never reached zero.

EASTERN WASHINGTON.

The records of the United States Weather Bureau concern nearly forty different stations in eastern Washington for periods of from one to twenty-three years. Fifteen of these stations lie within the Upper Sonoran area, the remainder within the Arid Transition. The Upper Sonoran stations are Ellensburg, Ephrata, Kennewick, Lind, Mottinger's Ranch, Moxee, Odessa, South Ellensburg, Sunnyside, Trinidad, Walla Walla, Wenache, and Zindel. The normal annual mean temperature for the whole region is 48.7°; for the Arid Transition stations alone it is 45.9°; and for the Upper Sonoran stations it is 51.3°.

The normal monthly mean temperatures for the stations located in the Arid Transition are as follows:

Temperature data for Arid Transition area.

Month.	Degrees F.	Month.	Degrees F.
January	21 to 34	July	62 to 72
February	25 to 38	August	62 to 74
March	30 to 43	September	51 to 63
April	43 to 52	October	44 to 55
May	51 to 58	November	32 to 42
June	55 to 65	December	25 to 36

The highest temperature recorded at these stations is 105°, the lowest is —32°.

The corresponding data for the stations located in the Upper Sonoran area are as follows:

Temperature data for Upper Sonoran area.

Month.	Degrees F.	Month.	Degrees F.
January	25 to 37	July	65 to 77
February	25 to 39	August	66 to 75
March	39 to 49	September	56 to 64
April	48 to 55	October	36 to 43
May	55 to 63	November	28 to 38
June	59 to 71	December	47 to 57

The maximum temperature ever observed at any of the above stations is 113°; the minimum is —30°.

As regards temperature, eastern Washington while having a normal annual mean but slightly lower than that of western Washington, has much greater extremes, being decidedly colder in winter and warmer in summer. The Upper Sonoran area as compared with the Arid Transition is several degrees warmer.

A notable feature of the temperature of Washington, in conformity with much of the region west of the Rocky Mountains, is the great variation of temperature between day and night, especially in summer. It is emphatically a region of cool nights, where one can appreciate blankets at night throughout the year. These cool nights are least marked in the Upper Sonoran area, and it may, indeed, be found that this factor is an important one in limiting the range of Upper Sonoran plants.

These cool nights naturally indicate late frosts in spring and early ones in autumn. In western Washington such killing frosts are not unusual up to April 15, and rarely a month later. Except in the warmest portions of eastern Washington killing frosts occur not uncommonly up to June 1, and infrequently three weeks later.

The first autumnal frosts in western Washington occur as early as the middle of September or as late as the middle of November; rarely they may be delayed until December. The dates are much the same for eastern Washington.

WINDS.

The most prevalent winds are from the southeast, and are usually accompanied by rain. East of the Cascade Mountains they are known as *chinooks*. This term is usually applied only to the winds that blow in the winter months, but there seems no proper reason to distinguish such from similar winds during the remainder of the year. The winter chinooks are commonly warm winds, accompanied or immediately followed by heavy rains; rarely they are cold and dry.

The wet chinooks are in eastern Washington remarkable chiefly for the rapid rising of the temperature which they occasion.

These winds are often quite severe. This is particularly true of the occasional southwest winds which occur in summer, which in eastern Washington usually assume the form of dust storms. Such storms may cause much destruction.

The only other winds deserving of special mention are those which sometimes occur in eastern Washington during the summer months, blowing from the north or northeast. These winds are gentle but exceedingly dry, and are therefore capable of causing great damage to growing crops. For this reason they are much feared in the agricultural districts.

THE ZONAL DISTRIBUTION OF WASHINGTON PLANTS.

That there are physical causes which profoundly influence the distribution of plants no one who has crossed the State of Washington from east to west can for a moment question. The contrast between the treeless bunchgrass prairies and sage plains of eastern Washington and the luxuriant coniferous forests of western Washington is too striking to overlook. In this particular case the principal factor is one of humidity, the Puget Sound region possessing a notably moist climate, while that of the Columbia Basin is markedly arid.

A similar change of vegetation may be witnessed in the ascent of any of our higher mountain peaks. As elevation increases the familiar lowland plants disappear and different ones present themselves, which in turn give way at high altitudes to still others. The most marked of these changes is that where the timber ceases and the alpine meadows present their charming carpet of flowers. Here the changes are due manifestly not to differences in humidity, but to lessened temperature, a conclusion emphasized by the fact that many of these alpine plants are the identical species which occur in arctic regions.

Heat and moisture are undoubtedly the principal physical factors upon which the distribution of plants depend. A third factor may be important, even determinative, namely, the character of the soil, but this is much less potent than the two above named. In addition to these physical factors only one other need be considered, the biological factor of *ancestry*. In general, plants inhabit the regions where their ancestors thrived. This factor is usually continental in its scope; thus cacti and yuccas are confined to America; eucalypti to Australia, and lilacs to Asia. But in a similar way this same factor operates over small areas, and it is the principal cause why the Pacific coast flora as a whole is different from that of the Atlantic. The existing plants are different because their immediate ancestors were, whatever factors may have determined that.

It is not to be understood from this that all the plants which formerly flourished in Washington have left descendants there. In Tertiary times such plants as palms, cinnamon trees, and sequoias grew in Washington. Some of these require tropical or subtropical conditions of heat; others, as the sequoias, probably have given way in competition with more aggressive species. Nevertheless the broad statement remains true that the present vegetation of the region owes its character in large part to similar ancestors. The conditions which make the Pacific coast the home of many peculiar genera and species are ancestral. The heat and moisture requirements of these plants are duplicated in other portions of the earth, where, however, totally different congeries of species occur.

It is generally admitted that heat is the most potent factor in determining the distribution of plants, and that in general the old division into Arctic, Temperate, and Tropical zones approximates the real truth. Such zonation, depending on heat, is far more wide-reaching than one depending mainly on moisture. While the former gives rise primarily to what we in general know as Arctic or Tropical zones, the factor of moisture determines the opposed conditions we distinguish as arid and moist. Differences in the heat factor are universal, resulting in the whole earth being divided into more or less well-marked zones, corresponding in general with isothermal lines. Differences in the moisture factor are relatively local, so that deserts may occur in the midst of the most varied surroundings.

While the larger zones depending on heat are strikingly different, yet each passes gradually into the contiguous ones. Determination of such zones is therefore more or less arbitrary. The scheme of life zones, so far as North America is concerned, that has resulted from the studies of Merriam has been generally adopted. It is as follows:

Boreal region	Arctic or Arctic-Alpine zone. Hudsonian zone. Canadian zone.	
Austral region	Transition zone	Alleghenian area. Arid Transition area. Pacific or Humid Transition area.
	Upper Austral zone	Carolinian area. Upper Sonoran area.
	Lower Austral zone	Austroriparian area. Lower Sonoran area.
Tropical region		Humid Tropical area. Arid Tropical area.

In this scheme zones are based primarily on the distribution of plants and animals as determined by the heat factor. The subdivision of the zones or areas depend mainly on the differences due to the moisture factor. As may readily be imagined, all possible combinations of these two factors occur, so that regions of mixed character are found wherever zones or areas are contiguous. This overlapping of contiguous zones that are usually well marked is perhaps more pronounced in the Pacific northwest than elsewhere in North America. It has been ascribed to the very equable temperature of the region. In consequence of this peculiarity the determination of the life zones in Washington, so as to coördinate them with adjacent regions, presents unusual difficulties. Six life zones or life areas are represented, namely, the Arctic, the Hudsonian, the Canadian, the Humid Transition, the Arid Transition, and the Upper Sonoran.

The first-mentioned zone, the Arctic, is sharply marked, consisting of the alpine flora above timber line. These alpine meadows correspond in conditions, and in a large part in species, with the arctic meadows north of the limit of timber.

The Upper Sonoran area in eastern Washington is practically coextensive with the distribution of the sagebrush. Agriculturally it is the region where the commercial growing of peaches and watermelons is practicable.

The Humid Transition, or Pacific area, includes the great forests of red fir in western Washington. Other characteristic trees are the giant cedar, red alder, and Oregon maple.

The Arid Transition area in eastern Washington includes two subdivisions, a lower one—the bunchgrass prairies, and an upper—the yellow pine forests.

The Canadian zone has for its most characteristic tree the western white pine. Here, too, the lodgepole pine, the western larch, and the western hemlock are most abundant and best developed.

The Hudsonian is the zone of the subalpine fir, the Alaska cedar, the black hemlock, and the white-bark pine. At their extreme limits of altitude all of these become prostrate mats of branches.

These zones are not separated by level altitudinal lines. This may readily be seen where the Hudsonian and Arctic zones meet. The trees of the former zone extend up the mountain sides much higher on the ridges than in the valleys between. The dividing line is thus a sinuate one. This has been considered by Merriam partly the result of more and less favorable exposure to the sun's rays, and partly to air currents, the warm currents tending to follow up the steep ridges while the cold currents flow down in the valleys. Consequently, certain species ascend highest on the warm ridges, while others descend farthest in the cool valleys.

Exactly similar conditions, but with the forest line reversed, are seen at the low altitude timber line of the yellow pine, where this borders on the bunchgrass prairies. The timber here descends to much lower altitudes along valleys and draws than on the ridges; or, what is the converse statement of the same thing, the bunchgrass flora ascends highest on the warm slope.

The most notable examples of the effect of slope exposure alone are perhaps seen on high ridges, or in canyons that extend in a general east and west direction. For example, Kamiak Butte, a bold peak in Whitman County, has nearly its entire south exposure covered by a bunchgrass flora, while the northern slope is densely timbered with yellow pine and other coniferous trees. In canyons of low altitude the sunny north wall is often timberless, while its shady south wall is timbered.

The same fact is generally true in the case of high mountain peaks. The corresponding zones extend relatively higher on the south or warmer side than on the north or colder side.

Making due allowance for the overlapping of the various zones, the following approximations of their altitudinal limits in Washington may be made:

Upper Sonoran, 65 to 600 meters (200 to 1,900 feet).
Humid Transition, 0 to 1,200 meters (0 to 3,800 feet).
Arid Transition, 500 to 1,300 meters (1,600 to 4,200 feet).
Canadian, 400 to 1,500 meters (1,400 to 5,000 feet).
Hudsonian, 1,500 to 2,100 meters (5,000 to 7,000 feet).
Arctic, 1,800 to 3,200 meters (6,000 to 10,500 feet).

UPPER SONORAN LIFE AREA.

This comprises the western or arid portion of the Upper Austral life zone. It occupies much of the Columbia and Great basins, and the lower portions of the Great Plains eastward to about the one hundredth meridian. It also extends southward into Mexico at increasing elevations along both sides of the Rocky Mountain system. In Washington the area is confined to that portion east of the Cascade Mountains below a contour line approximating 360 meters (1,200 feet), but on southerly slopes it may extend up to 510 meters (1,700 feet), or even more.

From an agricultural standpoint this zone is that in which the commercial culture of such crops as tomatoes, peaches, apricots, and watermelons is possible.

In Washington the most conspicuous plant of this zone is the sagebrush (*Artemisia tridentata*) (Pl. VI). It marks quite sharply the limits of the Upper Sonoran zone, seldom extending into the zone above, as it commonly does farther southward. Other characteristic, if less abundant, shrubs are rabbit brush (*Chrysothamnus nauseosus* and C. *viscidiflorus*), hop sage (*Grayia spinosa*), antelope brush (*Kunzia tridentata*, locally known as *black sage*), and, in alkaline situations, greasewood (*Sarcobatus vermiculatus*). In a few localities the sagebrush is absent, but in such cases one or more of the other characteristic shrubs is sure to be present.

Excepting such species as are confined to the moist ground along perennial streams, the great majority of the Upper Sonoran plants are either shrubs or thick-rooted perennial herbs or short-lived annuals.

There are in Washington about 500 species of plants which occur in this life zone. Of this number 243 species occur in no other life zone—that is, are distinctive. Furthermore, of this last element 39 species are confined in their distribution to the Columbian Basin of Washington, Oregon, and Idaho, several of them being quite rare and local.

ORIGIN OF THE UPPER SONORAN FLORA.

Some considerations regarding the origin of the Upper Sonoran species of the Washington flora seem to justify definite conclusions. In the geographical history of the Columbia Plains, as above outlined, there was found, during the existence of Lake John Day in Miocene-Tertiary time, a rich flora of subtropical aspect. Subsequent to this time and probably not much prior to the glacial epoch, occurred the principal uplift of the Cascade Mountains. This undoubtedly caused profound changes in climatic conditions, particularly to the eastward of this range, accompanied by correspondingly great changes in the flora.

Succeeding the uplifting of the Cascade Mountains came the Glacial period. During this period immense changes took place in western Washington, but there is scarcely a trace of glacial work on the plain of the Columbia. Nevertheless, in accord with the lower temperatures there was probably a general southward migration of the plants, followed by their return on the retreat of the ice.

Of the changes which have taken place in the flora since the John Day period to the present time there is no record preserved. In this enormous lapse of time—perhaps millions of years—a forest composed of magnolias, elms, sycamores, etc., apparently much like that of the Lower Mssissippi in the present day, has utterly vanished and no near relatives remain, either in the same or adjacent territory.

Inasmuch as somewhat similar subtropical forests existed in Miocene time in western Washington, the causes which have led to their extinction are more profound than such climatic changes as could be occasioned by the Cascade uplift and are to be sought rather in the general causes which have lowered the temperatures of the earth's surface.

There remains, then, but one source from which light may be thrown on the present constitution of the flora—namely, its relation to contiguous floras.

Such considerations naturally focus first on the physical conditions which most likely prevailed at the close of the last great geological cataclysm, namely, the Glacial period. The most conspicuous result of this period of cold is perhaps the large number of Arctic species which occur on all the higher peaks of the Cascades or stranded on isolated mountains, as the Olympics or the Blues—a fact which appears more striking in mountains farther to the southward. However slight the effect of the Glacial period may have been in eastern Washington, it is quite certain that the temperature was such that no plants adapted to Upper Sonoran conditions could survive. They were either driven southward, as were the Arctic plants, or else perished. Following the retreat of the ice, the areas that then became

Shrubs.

Amelanchier utahensis.
Artemisia tridentata.
Artemisia tripartita.
Chrysothamnus nauseosus.
Ericameria nana.
Eriogonum microthecum.
Eurotia lanata.
Grayia spinosa.
Kunzia tridentata.
Ramona incana.
Rhus glabra occidentalis.
Rhus toxicodendron.
Ribes aureum.
Ribes cereum.
Sarcobatus vermiculatus.
Tetradymia canescens.

Herbs.

Adenostegia capitata.
Artemisia dracunculoides.
Asclepias mexicana.
Atriplex canescens.
Bergia texana.
Carex douglasii.
Castilleja pallescens.
Chaenactis douglasii.
Chorizanthe watsoni.
Chrysopsis villosa.
Cleome lutea.
Coldenia nuttallii.
Coleosanthus linifolius.
Comandra pallida.
Corispermum hyssopifolium.
Cryptanthe pterocarya.
Dondia depressa.
Erigeron concinnus.
Erigeron divergens.
Euphorbia glyptosperma.
Gaertneria acanthicarpa.
Gaura parviflora.
Gilia leptomeria.
Gilia parviflora.
Gilia pungens hookeri.
Hymenopappus tenuifolius.
Iva axillaris.
Iva xanthifolia.
Lactuca pulchella.
Lappula occidentalis.
Lupinus pusillus.
Mamillaria sp.
Mollugo verticillata.
Monolepis pusilla.
Nicotiana attenuata.
Oreocarya leucophaea.
Orobanche ludoviciana.
Orogenia linearifolia.
Oxytheca dendroidea.
Pentstemon acuminatus.
Pentstemon deustus.
Pentstemon gairdneri.
Pentstemon glaber.
Phaca inflexa.
Phacelia linearis.
Phlox longifolia.
Phragmites phragmites.
Piptocalyx circumscissa.
Psoralea lanceolata scabra.
Ptiloria paniculata.
Ptiloria tenuifolia.
Rumex venosus.
Schoenocrambe linifolia.
Sitanion hystrix.
Solanum triflorum.
Sphaeralcea munroana.
Sporobolus airoides.
Sporobolus asperifolius.
Sporobolus cryptandrus.
Streptanthus longirostris.
Stipa bloomeri.
Stipa comata.
Stipa occidentalis.
Stipa thurberiana.
Thelypodium integrifolium.
Thelypodium laciniatum.
Thelypodium nuttallii.
Trifolium megacephalum.
Zygadenus paniculatus.

From the foregoing lists it is evident that the greater portion of the Upper Sonoran flora in Washington is of Great Basin origin. The comparatively small proportion of Californian species is probably due partly to the barriers through which few plants of this zone have succeeded in passing. This is indicated by the fact that a much larger proportional number of Arid Transition plants have found their way from California into the Columbia Basin, as hereafter shown.

There is a third element, however, in the make-up of the Upper Sonoran flora of Washington, namely, those species which seem to have originated in the Columbia Basin, or at least are not known elsewhere.

SPECIES PECULIAR TO THE COLUMBIA BASIN.

Abronia mellifera.
Antennaria flagellaris.
Arabis whitedii.
Arenaria franklinii.
Claytonia arenicola.
Conanthus parviflorus.
Eragrostis lutescens.
Erigeron curvifolius.
Erigeron filifolius.
Erigeron linearis.
Erigeron poliospermus.
Eriogonum niveum.
Eriogonum proliferum.
Erysimum occidentale.
Gilia leptomeria.
Helianthus cusickii.
Lappula arida.
Lappula ciliata.
Leptotaenia purpurea.
Leptotaenia salmoniflora.
Lesquerella douglasii.
Lomatium geyeri.
Oreocarya celosioides.
Oreocarya spiculifera.
Pentstemon glandulosus.
Pentstemon pruinosus.
Phaca collina.
Phaca diphysa.
Phaca lyallii.
Phaca miscella.
Phaca reventa.
Phaca sclerocarpa.
Phaca sinuata.
Phaca speirocarpa.
Phacelia lenta.
Pteryxia terebinthina.
Talinum spinescens.
Thelypodium streptanthoides.
Tonella floribunda.
Townsendia florifer.
Trifolium megacephalum.
Viola trinervata.

HUMID TRANSITION AREA.

The Pacific coast region west of the Cascade Mountains in British Columbia, Washington, Oregon, and northwestern California, is notable for its moist climate and equable temperature no less than for the very luxuriant forests which these conditions foster. This region has sometimes been referred to as the Northwest Coast Strip, an unfortunate name, as the term "Northwest" has been used in too many senses to give it accuracy. Adopting a suggestion of Mr. D. A. Brodie, the term Vancouver Strip is here given to the region, for which it is desirable to have a definite name in conformity with the remarkably uniform flora and fauna which it possesses. The name above suggested commemorates the name of the navigator who first thoroughly explored the region and whose name has there been attached to the largest island and to two important towns.

Much the greater portion of the Vancouver Strip belongs to the Pacific or Humid Transition area. The most characteristic tree is

flowered currant (*Ribes sanguineum*). By this time the Scouler willow is conspicuous, and in wet places the red alder (*Alnus oregana*). These two trees dominate the vegetation until the young red firs which spring up in a very dense growth have become large enough to supersede them. The red fir is so completely the dominant tree in the region that as a rule it quickly reforests itself whenever destroyed.

BOTTOM LANDS.

The bottom lands of western Washington are mainly river valleys. Less commonly they occur about lake borders or form marshes. The commonest type of forest covering is a red alder and giant cedar association, which, however, is seldom pure. Rarely either one of these trees may occupy the ground exclusively. Usually, however, there are associated various other trees, as white fir (*Abies grandis*), large-leaved maple (*Acer macrophyllum*), Oregon ash (*Fraxinus oregana*), and cottonwood (*Populus trichocarpa.*) The cottonwood often forms groves of pure growth in the river valleys, and the maple does so occasionally. Moisture of the soil is apparently the one factor that favors the red alder-cedar association, which is quite as common on springy hillsides and upland swamps as in river valleys. Where the amount of soil moisture is not too great the red fir occurs sparingly, but the individuals are often of gigantic size. In bottom lands that are excessively wet, the alder is absent and often the cedar also. Such lands commonly are covered by dense thickets composed of various species of willows, western cornel (*Cornus occidentalis*), crabapple (*Pyrus diversifolia*), and vine maple (*Acer circinatum*). These same species form the usual fringe along the banks of small streams flowing through the forest, especially the cornel and the vine maple. In such situations occur also various shrubs, as the devil's club (*Echinopanax horridum*) which, contrary to the oft-told tale, seldom forms dense thickets, the salmon berry (*Rubus spectabilis*), the fetid currant (*Ribes bracteosum*), and the red-berried elder (*Sambucus callicarpa*).

GRAVELLY PRAIRIES.

The soil of these prairies, which are comparatively limited in extent, consists mainly of fine water-worn gravel, the pebbles making up perhaps 50 per cent, or more, of the soil. The prairies commonly present the appearance of a sterile pasture (Pl. IX) with scattered oaks (*Quercus garryana*) here and there, and occasional beautifully symmetrical young trees of red fir. At the edges of the prairie, where the gravelly soil ceases, a dense forest of red fir usually occupies the ground, the gravelly prairie soil serving as an almost perfect barrier to this tree. In a few localities, where the gravelly soil merges gradually into the ordinary loams or clays of the region, the black pine (*Pinus contorta*) disputes the ground with the red fir. Until the middle of July these prairies are carpeted with flowers (Pl. X). After this time they present a distinctly arid appearance.

The flora consists of a considerable number of species which, so far as Washington and Oregon are concerned, do not occur elsewhere, though most of them range into California. Among them are the following:

Arenaria tenella.
Dodecatheon latifolium.
Erythronium giganteum.
Gilia tenella.
Godetia amoena.
Godetia quadrivulnera.
Grindelia integrifolia.
Hemizonella durandi.
Hookera coronata.
Hookera pulchella.
Hosackia gracilis.
Iris tenax.
Lomatium utriculatum.
Lupinus albicaulis.
Lupinus lepidus.
Microseris laciniata.
Orthocarpus attenuatus.
Platystigma oreganum.
Ranunculus orthorhynchus.
Senecio fastigiata.
Sericocarpus rigidus.
Solidago tolmicana.
Synthyris rotundifolia.
Trifolium hallii.
Trifolium tridentatum.
Valerianella congesta.
Viola howellii.

A much larger number of species, however, recur in the Arid Transition area east of the Cascade Mountains. Nearly all of these species are limited to the Pacific coast, ranging from California northward to British Columbia on both sides of the Cascade Mountains. Here, as in the case of the Upper Sonoran species of California origin, there is good reason to believe that most of the species reached the Columbia Basin through the Klamath Gap. Characteristic examples are the following:

Agoseris heterophylla.
Alchemilla occidentalis.
Alsine nitens.
Antennaria howellii.
Athysanus pusillus.
Balsamorhiza balsamorhiza.
Balsamorhiza deltoidea.
Boisduvalia stricta.
Carum gairdneri.
Caucalis microcarpa.
Ceanothus sanguineus.
Collinsia grandiflora.
Crocidium multicaule.
Eriocephalum lanatum.
Erigeron speciosus.
Gilia capitata.
Gilia gracilis.
Githopsis specularioides.
Heterocodon rariflorum.
Heuchera cylindrica.
Hieracium scouleri.
Hookera hyacinthina.
Hosackia decumbens.
Lomatium nudicaule.
Lomatium triternatum.
Micrampelis oregana.
Navarretia intertexta.
Pectocarya penicillata.
Pinus ponderosa.
Polemonium micranthum.
Prunus demissa.
Psilocarphus elatior.
Quercus garryana.
Sedum douglasii.
Sidalcea campestris.
Silene menziesii.
Sisyrinchium grandiflorum.
Tellima parviflora.
Thysanocarpus curvipes.
Tonella collinsioides.
Zygadenus venenosus.

SEASHORES.

Immediate proximity to the sea furnishes conditions that support a strip of vegetation consisting of few but very characteristic species. On the Washington coast there are two marked formations—the sand dunes and the salt marshes.

Typical sand dunes are confined to the ocean coast, not occurring on Puget Sound. The important sand-loving plants are:

Abronia latifolia.
Abronia umbellata.
Carex macrocephala
Glehnia littoralis.
Lathyrus littoralis.
Lupinus littoralis.
Poa macrantha.
Tanacetum huronense.

Less abundant, but not less characteristic, are:

Agoseris maritima.
Carex pansa.
Gaertneria chamissonis.
Juncus lesueurii.
Pentacaena ramosissima.
Poa confinis.
Polygonum paronychia.
Sanicula howellii.

In the lee of the dunes or on shores where the sand does not drift there is often a strip of black pine (*Pinus contorta*), forming dense thickets, the trees seldom over 30 feet high. Where not timbered various species adapted to campestrine conditions abound, but few of them are confined to the seashore. Such are:

Argentina anserina.
Carduus edulis.
Cerastium arvense.
Festuca rubra.
Fragaria chiloensis.
Trifolium wormskioldii.
Viola adunca.

Intermediate in character between these meadowy beaches and sand dunes are sand spits and high, sandy beaches. These maintain, in consequence, a rather mixed flora.

Salt or brackish marshes are most commonly found on low shores, especially near the mouths of streams, where they are at least occasionally covered by high tides. They often occur also behind high sea beaches. Most of the plants are those which love a saline soil. The most characteristic are saltgrass (*Distichlis spicata*) and glasswort (*Salicornia ambigua*), the latter often infested with a dodder (*Cuscuta squamigera*).

A portion of the plants found in these seashore marshes are confined to the immediate proximity of the sea. Such are:

Ammodenia peploides.
Atriplex littoralis.
Carex cryptocarpa.
Coelopleurum maritimum.
Conioselinum fischeri.
Jaumea carnosa.
Lathyrus maritimus.
Orthocarpus castilleioides.
Sidalcea hendersoni.
Tissa marina.

Others occur also in alkaline marshes in the interior, such as *Juncus balticus*, *Glaux maritima*, and *Triglochin maritimum*.

A few other species exhibit a marked predilection for proximity to the sea without being apparently either sand-loving or salt-loving plants. Such are:

Artemisia suksdorfi.
Calamagrostis aleutica.
Hydastylus borealis.
Hydastylus brachypus.
Poa pachypholis.
Polypodium scouleri.
Salix hookeriana.
Selaginella struthioloides.

In addition to these the marine aquatic genera Zostera and Phyllospadix deserve mention as our only genera of flowering plants found in the ocean. The related *Ruppia maritima* occurs in brackish waters.

SPHAGNUM BOGS.

Sphagnum bogs are quite common throughout western Washington. The usual shrubs are Labrador tea (*Ledum latifolium*), laurel (*Kalmia glauca*), and cranberry (*Oxycoccus oxycoccus intermedius*). Usually a willow (*Salix myrtilloides*), sweet gale (*Myrica gale*), and a dwarf birch (*Betula glandulosa*) are present also. On the drier hummocks small hemlocks (*Tsuga heterophylla*) often occur, and in similar situations one is often surprised to find the black pine (*Pinus contorta*), typically a plant of barren, gravelly or sandy soil.

The more interesting and characteristic herbs are sundew (*Drosera rotundifolia*), cotton-grass (*Eriophorum russeolum*), *Scheuchzeria palustris*, and *Juncus oregana*.

In the bogs near the ocean coast *Ledum columbianum* and *Myrica californica* replace their two close relatives.

THE COASTAL STRIP.

One other important forest association of Washington, namely, the tideland or Sitka spruce forests, in immediate proximity to the Pacific Ocean, is perhaps best classed as Humid Transition zone rather than otherwise. The facts in the distribution of this species are peculiar. It is the dominant tree, forming over 50 per cent of the forest strip, along the coast from middle Oregon northward to Kadiak Island, beyond which all timber ceases, and the flora becomes almost that of the Artic Zone. Therefore we have this one species of tree dominating a continuous stretch of sea level, from the Arctic Zone to the Humid Transition, through both the Hudsonian and the Canadian zones. In the north the Sitka spruce forests end sharply with the arctic meadows. In the south they merge imperceptibly with the red-fir forests. This enormous stretch of a single species at sea level is probably due to the remarkably equable temperature and great humidity of the immediate seacoast.

That this strip of Sitka spruce should be considered Humid Transition rather than Canadian or Hudsonian is open to question. Accompanying the spruce throughout all or nearly all of its range, are some other plants, such as *Ribes laxiflorum*, *Moneses uniflora*, *Menziesia ferruginea*, *Cornus canadensis*, and *Viola glabella*, which in the Cascade Mountains occur mainly or only in the Canadian or Hudsonian zones.

On the other hand, it is very evident that the great majority of the plants in the Sitka spruce forests of Washington are truly Transition plants. Indeed, some of the most characteristic of the undershrubs of the red-fir forests are even more luxuriantly developed in the spruce forests, such as the salal (*Gaultheria shallon*), red huckleberry (*Vaccinium parvifolium*), and the evergreen huckleberry (*V. ovatum*). Some others, as the salmon berry (*Rubus spectabilis*) and the devil's club (*Echinopanax horrida*), accompany the spruce throughout nearly all of its range, and likewise occur in the Cascade Mountains far above it in altitude.

Other facts of plant distribution also bear out the conclusion that the mixed floral character of the ocean coast is due to the remarkably equable temperature. One of these is the fact that a number of Alaskan plants follow down the coast with the spruce, but do not follow down the mountain ranges. Such are the marsh plants *Viola langsdorfii*, *Nephrophyllidium crista-galli*, and *Caltha asarifolia;* the dune plants, *Carex macrocephala*, and *Glehnia littoralis;* and *Calamagrostis aleutica*, *Coelopleurum gmelini*, which on the Washington coast splits into two supposedly different species, *Carex cryptocarpa*, *Conioselinum fischeri*, and *Ammodenia peploides.*

On the other hand, the northward extension of various Californian coastal plants overlaps the southward extension of these Alaskan species. Among these are *Abronia latifolia* and *A. umbellata*, *Angelica hendersoni*, *Gaertneria chamissonis*, *Myrica californica*, and *Pentacaena ramosissima.*

Perhaps, too, the peculiar conditions of this coastal strip may aid in explaining the local abundance of *Pinus contorta*, which otherwise reappears principally in the lodge-pole forests of the Canadian zone.

The zonal position of the Sitka spruce itself is a difficult matter to decide. Undoubtedly it reaches its greatest development as to size on the Washington and Oregon coasts, but on the Alaska coast it reaches its greatest development as regards number of individuals and domination of the forest.

ARID TRANSITION AREA.

In Washington this is confined entirely to the eastern portion, except, perhaps, a few limited localities west of the Cascades, heretofore discussed. In our limits this area has two marked subdivisions. The lower subdivision is grass-covered and lies immediately above the zone of the sagebrush. The conspicuously abundant plants are bunchgrass (*Agropyron spicatum*) and a June grass (*Poa sandbergii*). Indeed, these areas are often called bunchgrass prairies. They constitute the most extensive and valuable lands of the Columbia Basin, and consist entirely of basaltic soil, except in a few gravelly valleys of glacial origin. The upper subdivision is covered by a forest of yellow pine. This grows mostly on soils of granitic origin above the level of the Columbia lava.

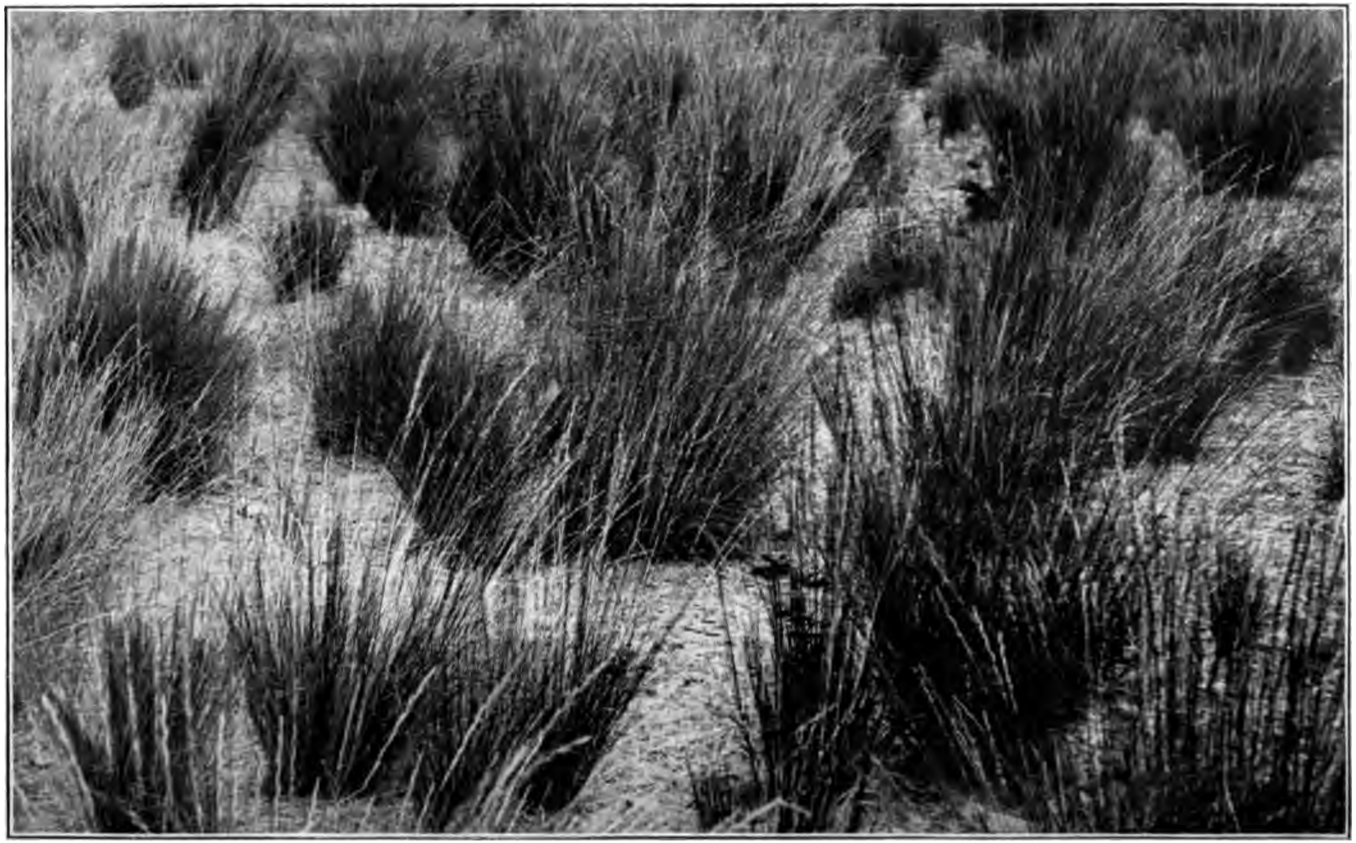
THE BUNCHGRASS PRAIRIES.

These constitute a belt of varying width lying between the zone of sagebrush below and that of yellow pine above. Altitudinally they lie between 500 and 800 meters. The bunchgrass prairies are best developed in extreme eastern Washington, there constituting the rolling hills known as the Palouse and Walla Walla regions. In the so-called "Big Bend Country" of Lincoln and Douglas counties the prairies are very similar, but less rolling. In Yakima and Klickitat counties the bunchgrass lands are confined to the high plateaus, known as the Rattlesnake Mountains and Horse Heaven (Pl. XI). On the eastern slopes of the Cascade Mountains they are limited in extent.

The basaltic soil of these prairies where the rainfall is comparatively large is a black clay loam, perfectly free from grit. The subsoil is similar, but yellowish in color. These soils have originated wholly from the decomposition of basalt in place, and vary from a few inches to 50 feet or more in depth. Owing to the prevailing southwest winds the hills have, as a rule, much steeper north and northeast slopes, on which the accumulated soil is unusually fine and deep. These moister "north hillsides" support a vegetation much like the narrow vales or draws between the hills.

In regions of decreasingly less rainfall there is a correspondingly smaller degree of disintegration of the basaltic rock, which indeed often crops out upon the surface. Such rocky lands are locally called "scab" or "scablands." The lie for the most part between the typical bunchgrass prairies and the sagebrush plains, but possess in the main the flora of the former.

The bunchgrass prairies (Pl. XII) are treeless, and excepting along streams and by springs, or on north hillsides, shrubs are rarely seen. Of the herbaceous vegetation, apart from the grasses, the most conspicuous plants are the lupines (*Lupinus ornatus*, *L. sericeus*, and *L. wyethii*), often very abundant; the sunflowers (*Balsamorhiza sagittata* and *Helianthella douglasii*), *Gaillardia aristata*, *Geranium incisum*, and *Leptotaenia multifida*. In moister places *Iris missouriensis*



PRAIRIE OF BUNCHGRASS (AGROPYRON SPICATUM) ON THE HORSE HEAVEN HILLS, KLICKITAT COUNTY.

cially sticky laurel (*Ceanothus velutinus*) and thimbleberry (*Rubus parviflorus*), form dense thickets.

Such Arid Transition forests, in which the red fir becomes the most abundant tree, resemble very closely the Humid Transition forests of western Washington. Indeed, they are intermediate in character between the two, merging at lower altitudes into the ordinary yellow pine forests, and at higher altitudes into the Canadian or white pine zone. Inasmuch as the Canadian and higher zones in the Bitterroot Mountains have a flora very similar to that of the Cascade Mountains, it is not surprising that the higher and moister portion of the Arid Transition shows a like similarity.

ORIGIN OF THE ARID TRANSITION FLORA.

The Arid Transition flora, like the Upper Sonoran, is clearly made up for the most part of three sets of species. These may be denominated the Californian element, consisting of plants which have migrated from California; the Rocky Mountain element, species whose distribution is easterly and southerly from the region here considered; and the Columbian element, those species which are confined to the Columbia Basin and have in all probability originated there.

THE CALIFORNIA ELEMENT.

This consists of species which range from California through the low passes in the Klamath region into the Columbia Basin. A large number of the species range also into the Willamette Valley on the west side of the Cascade Mountains, most of these also reaching the gravelly prairies of western Washington. These species have been discussed in connection with the Humid Transition area. The following list is composed of species confined to the Arid Transition area east of the Cascade Mountains:

Agoseris grandiflora.
Agoseris retrorsa.
Alopecurus californicus.
Amsinckia intermedia.
Arabis subvillosa.
Arenaria pusilla.
Calandrinia menziesii.
Calochortus macrocarpus.
Ceanothus prostratus.
Clarkia rhomboidea.
Cuscuta californica.
Deschampsia calycina.
Elatine californica.
Eriogonum sphaerocephalum.
Eryngium articulatum.
Festuca confusa.
Festuca pacifica.
Frasera nitida.
Gilia harknessii.
Lagophylla ramosissima.
Lepidium nitidum.
Linum digynum.
Lomatium piperi.
Melica fugax.
Merathrepta californica.
Microseris nutans.
Mimulus pulsiferae.
Orthocarpus hispidus.
Orthocarpus tenuifolius.
Pectocarya penicillata.
Pectocarya pusilla.
Plagiobothrys tenellus.

Parrya menziesii.
Pentstemon attenuatus.
Pentstemon pinetorum.
Pentstemon richardsonii.
Pentstemon triphyllus.
Phaca arrecta.
Phaca conjuncta.
Phaca spaldingii.
Physaria geyeri.
Platyspermum scapigerum.
Polygonum polygaloides.
Ranunculus triternatus.
Silene spaldingii.
Sphaeralcea longisepala.
Trifolium douglasii.
Trillium petiolatum.
Viola trinervata.

COMPARISON OF THE HUMID AND ARID TRANSITION FLORAS.

As before stated, the Cascade Mountains form a sharp and efficient barrier between the areas of the Transition zone. The Humid Transition does not cease abruptly with the crest of the Cascade Mountains, but many species descend for some distance on the eastern slope, at lower altitudes becoming mixed indiscriminately with Arid Transition plants.

In the moisture portions of the western slopes of the Bitterroots and in the Blue Mountains the climatic conditions approach those of western Washington. It is therefore not surprising that in the moister portions of the yellow pine subarea in western Idaho a great many of the Humid Transition plants of western Washington reappear. Indeed at least one-half of the species are thus common, and it is therefore largely an arbitrary matter to class the one as Humid Transition, the other as Arid.

The complex nature of the problem is realized, however, when we consider the remaining species. They may be thus grouped: First, those that occur in the Vancouver strip, but not in North Idaho; second, those that occur in Idaho, but not in the Vancouver strip, and third, those that are abundant in Idaho, but very rare in the latter area. The following tables bring out clearly the relative importance of these elements:

PLANTS EQUALLY COMMON IN THE HUMID TRANSITION AREA OF THE VANCOUVER STRIP AND THE MOISTER PORTION OF THE YELLOW PINE SUBAREA IN NORTH IDAHO.

Trees.

Abies grandis.
Acer douglasii.
Pinus contorta.
Pinus monticola.
Populus trichocarpa.
Pseudotsuga mucronata.
Rhamnus purshiana.
Salix scouleriana.
Taxus brevifolia.
Thuya plicata.
Tsuga mertensiana.

Shrubs.

Alnus sinuata.
Amelanchier florida.
Ceanothus sanguineus.
Ceanothus velutinus.
Chimaphila umbellata.
Linnaea americana.
Lonicera involucrata.
Menziesia ferruginea.
Opulaster opulifolius.
Pachystima myrsinites.
Ribes lacustre.
Rosa gymnocarpa.
Rubus leucodermis.
Rubus parviflorus.
Salix cordata.
Schizonotus discolor.
Vaccinium macrophyllum.

Herbs.

Actaea arguta.
Adenocaulon bicolor.
Alsine crispa.
Alsine longipes.
Antennaria howellii.
Aquilegia formosa.
Asarum caudatum.
Asplenium cyclosorum.
Carduus edulis.
Carex amplifolia.
Carex stipata.
Cephalanthera austinae.
Cinna pendula.
Circaea pacifica.
Cytherea bulbosa.
Dryopteris dilatata.
Festuca occidentalis.
Festuca subulata.
Galium trifidum.
Geum macrophyllum.
Gilia capitata.
Hieracium albiflorum.
Lactuca spicata.
Lysichiton kamtschatcensis.
Melica subulata.
Micromeria chamissonis.
Mimulus moschatus.
Ophrys cordata.
Panicularia pauciflora.
Peramium menziesii.
Pteridium aquilinum pubescens.
Pyrola aphylla.
Pyrola bracteata.
Pyrola incarnata.
Pyrola picta.
Quamasia quamash.
Ranunculus bongardi.
Scirpus microcarpus.
Solidago elongata.
Trautvetteria grandis.
Trillium ovatum.
Vagnera amplexicaulis.
Vagnera sessilifolia.
Viola adunca.
Washingtonia divaricata.
Xerophyllum tenax.

PLANTS THAT OCCUR IN THE VANCOUVER STRIP, BUT NOT IN NORTH IDAHO.

Trees.

Acer circinatum.
Acer macrophyllum.
Alnus oregana.
Arbutus menziesii.
Pyrus diversifolia.
Salix lasiandra.

Shrubs.

Arctostaphylos tomentosa.
Gaultheria shallon.
Rhododendron californicum.
Rhus diversiloba.
Ribes bracteosum.
Ribes divaricatum.
Ribes sanguineum.
Sambucus callicarpa.
Vaccinium ovatum.
Vaccinium parvifolium.

Herbs.

Achlys triphylla.
Allotropa virgata.
Bikukulla formosa.
Equisetum telmateia.
Hemitomes congestum.
Juncus covillei.
Juncus oxymeris.
Lathyrus polyphyllus.
Leptaxis menziesii.
Lupinus rivularis.
Petasites speciosa.
Poa howellii.
Polypodium occidentale.
Struthiopteris spicant.
Synthyris rotundifolia.
Vancouveria hexandra.
Vicia gigantea.
Viola howellii.

PLANTS THAT OCCUR IN THE MOISTER PARTS OF THE YELLOW PINE SUBAREA IN WESTERN IDAHO, BUT NOT IN THE HUMID TRANSITION OF WESTERN WASHINGTON.

Trees.

Alnus tenuifolia.
Larix occidentalis.

Shrubs.

Andromeda polifolia.
Berberis repens.
Chiogenes hispidula.
Cornus stolonifera.
Lonicera conjugialis.
Rhamnus alnifolia.
Ribes irriguum.
Ribes viscosissimum.
Rubus strigosus.
Sambucus melanocarpa.
Spiraea corymbosa.
Spiraea menziesii.

Herbs.

Aconitum columbianum.
Acorus calamus.
Antennaria racemosa.
Aralia nudicaulis.
Arnica cordifolia.
Aster laevis geyeri.
Calochortus elegans.
Carex geyeri.
Carex nebraskensis.
Clematis columbiana.
Clematis hirsutissima.
Coptis occidentalis.
Frasera thyrsiflora.
Gentiana oregana.
Hydrophyllum capitatum.
Ligusticum verticillatum.
Mitella stauropetala.
Pentstemon pinetorum.
Petasites dentata.
Ranunculus platyphyllus.
Rudbeckia occidentalis.
Sanicula marilandica.
Sphaeralcea rivularis.
Synthyris rubra.
Therofon majus.
Trillium petiolatum.

HUMID TRANSITION PLANTS COMMON IN WESTERN WASHINGTON, BUT VERY RARE IN NORTHERN IDAHO.

Trees.

Cornus nuttallii. **Occurs** only in the valley of the middle fork of the Clearwater.

Shrubs.

Berberis nervosa. Near Farmington.
Cornus occidentalis. Near Spokane, Wash.
Corylus californica. Near Kettle Falls, Wash.
Echinopanax horridum.
Gaultheria ovatifolia. Priest Lake.
Rubus macropetalus.
Rubus spectabilis. Priest Lake, very rare.

Herbs.

Antennaria howellii. Cedar Mountain. Spangle, Wash.
Claytonia parvifolia. Priest Lake; Packsaddle Peak.
Collinsia grandiflora. Troy.
Collomia heterophylla. Wiessner Peak.
Corallorhiza striata. Cedar Mountain.
Erigeron speciosus.
Fritillaria lanceolata. Farmington Landing. Palouse City, Wash.
Heuchera cylindrica. Near Lewiston.
Hosackia bicolor.
Howellia aquatilis. Lake Tesemini.
Lilium parviflorum. Lake Pend Oreille.
Maianthemum bifolium kamtschaticum. Priest Lake.
Micrampelis oregana. Umatilla River, Oreg. Kettle Falls, Wash.
Mitella caulescens. Farmington Landing.
Polygonum bistortoides. Near Moscow.
Polystichum munitum. Cedar Mountain. Also in Blue Mountains.
Psoralea physodes. One station near Troy.
Saxifraga oregana. Priest Lake.
Stenanthium occidentale. Priest Lake.
Trientalis latifolia. Wiessner Peak. Blue Mountains, Wash.
Vaccinium ovalifolium. Priest Lake.

In this connection the fact may also be pointed out that in several cases the species of the coast region are replaced in Idaho by very close allies. This fact is illustrated by the following pairs:

Coast region of Washington:	Northern Idaho:
Alnus oregana.	*Alnus tenuifolia.*
Philadelphus gordonianus.	*Philadelphus lewisii.*
Potentilla gracilis.	*Potentilla blaschkeana.*
Ranunculus orthorhynchus.	*Ranunculus platyphyllus.*
Ribes divaricatum.	*Ribes irriguum.*
Salix lasiandra.	*Salix lancifolia.*
Sambucus callicarpa.	*Sambucus melanocarpa.*
Spiraea douglasii.	*Spiraea menziesii.*
Viola sempervirens.	*Viola orbiculata.*

Perhaps the most significant of the above lists is that of the species which are now so rare in Idaho, but abundant in western Washington. These species must be either relatively newcomers, just obtaining a foothold, or else old inhabitants, now on the verge of extinction, so far as this immediate region is concerned. The latter hypothesis seems to be by far the more likely one. First, because these rare species show none of the aggressiveness to be expected in recent introductions that have found a congenial environment; second, because this hypothesis fits in with the explanation that these species were forced southward in the glacial period, and under the changed conditions following have lingered in regions to which they are not well adapted.

One other fact indicates also that many species have had to adjust themselves to a changed environment, and as this has been done without morphological change, the readjustment must have been recent. In endeavoring to fix the zonal limits of plants which occur on both sides of the Cascade Mountains, the curious fact becomes evident that many species have a lower zonal range in the interior region than that which they occupy in the coastal area. Among the examples may be cited the following:

Populus trichocarpa, a Humid Transition or even Canadian species in western Washington, is more abundant east of the Cascades as an Upper Sonoran than as an Arid Transition plant. Other species of which the same statement holds true are:

Delphinium menziesii.
Geranium carolinianum.
Heuchera cylindrica.
Lomatium nudicaule.
Rhamnus purshiana.
Schizonotus discolor.
Specularia perfoliata.

It may be argued that the Humid Transition character of these plants is not altogether demonstrated in their zonal range in western Washington where no lower zone occurs. But nearly all of the above species in their range southward confine themselves strictly to the Transition Area.

Some species, typically Canadian on the west slopes of the Cascades, are just as typically Arid Transition in the Bitterroots. *Vaccinum macrophyllum* is perhaps the most conspicuous example of this, but it is also illustrated in less degree by *Pterospora andromedea* and *Cornus canadensis.*

Pedicularis racemosa and *P. bracteosa* in the Cascades and Olympics are Hudsonian species, extending more or less into the Arctic above or the Canadian below. On the west slope of the Bitterroots they occur in undoubted Arid Transition, ranging also into the Canadian. This same statement also applies to:

Abies lasiocarpa.
Alnus sinuata.
Gaultheria ovatifolia.
Hemieva ranunculifolia.
Hydrophyllum albifrons.
Pentstemon confertus.
Pentstemon procerus.
Polygonum bistortoides.
Saussurea americana.
Stenanthium occidentale.
Thalictrum occidentale.
Trautvetteria grandis.

These instances are not to be confused with those illustrated by plants of wide altitudinal range, like *Castilleja miniata*, which occurs in all the zones from Upper Sonoran to Arctic, as do also *Castilleja angustifolia*, *Aquilegia formosa*, *Heracleum lanatum*, *Hypericum scouleri*, *Achillea millefolium*, and others.

The condition that has determined this strange nonconformity in the altitudinal or zonal relations of the species above mentioned is perhaps to be sought in the lower winter temperatures of the interior. This factor alone may tend to confine a species to the lowest zonal position in which it can maintain its existence.

THE CANADIAN ZONE.

This is the most illy defined of all the life zones in Washington, merging into the Transition below and the Hudsonian above. Its most characteristic tree is perhaps the western white pine (*Pinus monticola*), but in Washington this tree is not abundant. In the Olympic and Cascade mountains the amabilis fir (*Abies amabilis*) is also a characteristic tree, as is its near relative, the noble fir (*A. nobilis*), found in the Cascades from Mount Stuart southward. Apart from these truly characteristic trees, the white fir (*Abies grandis*) and the western hemlock (*Tsuga heterophylla*) (Pl. XVI) both find their best development in the Canadian zone, but both also are not rare at sea level. The dominant tree of the Humid Transition zone, the red fir, also thrives in the company of its Canadian relatives.

On the eastern slopes of the Cascades, and more especially in the mountains of eastern Washington, two other trees appear in the Canadian zone, the Engelmann spruce (*Picea engelmanni*) and the western larch (*Larix occidentalis*), while the amabilis and noble firs disappear.

A characteristic plant association of this zone is that of the lodgepole pine, a form of *Pinus contorta*, which often forms dense forests. The trees are remarkably uniform in size, seldom exceeding 1 foot in diameter and 60 feet in height. Such forests are often very extensive, the one species making up 90 per cent of the timber. While most abundant in the Canadian zone, groups of the lodgepole pine occasionally occur isolated in yellow pine forests.

There are but few plants in Washington confined to the Canadian zone. The somber depths of these moist forests, however, induces a luxurious carpet of mosses and a vegetation which is largely ericaceous. Among the more plentiful shrubs are the blue huckleberry (*Vaccinium ovalifolium*), *Menziesia ferruginea*, *Pachystima myrsinites*, the trailing *Rubus nivalis*, and the dwarf cornel (*Cornus canadensis*).

The abundant herbs are:

Clintonia uniflora.
Disporum oreganum.
Leptaxis menziesii.
Mitella caulescens.
Oxalis oregana.
Oxalis trilliifolia.
Phegopteris dryopteris.
Trautvetteria grandis.
Vagnera sessilifolia.

Most of these occur also in the Transition.

The zone can, in fact, be recognized in Washington not so much by any purely characteristic species as by the great abundance of species relatively rare in the contiguous zones.

CHARACTERISTIC SPECIES OF THE CANADIAN ZONE.[a]

Trees.

Abies amabilis.
Abies grandis
Abies nobilis.
Acer douglasii.
Pinus monticola.
Taxus brevifolia.

Shrubs.

**Cornus canadensis.*
**Lonicera conjugialis.*
Lonicera utahensis.
Menziesia ferruginea.
Pachystima myrsinites.
Pyrus sitchensis.
**Ribes ciliosum.*
Ribes laxiflorum.
**Ribes viscosissimum.*
**Rubus nivalis.*
**Sambucus melanocarpa.*
Symphoricarpos acutus.
**Vaccinium scoparium.*

Herbs.

Allotropa virgata.
**Anemone deltoidea.*
**Anemone piperi.*
Antennaria racemosa.
Arnica cordifolia.
**Cacaliopsis nardosmia glabrata.*
**Capnoides scouleri.*
**Cardamine lyallii.*
Cephalanthera austinae
Chelone nemorosa.
**Circaea alpina.*
Claytonia asarifolia.
**Clintonia uniflora.*
Coptis occidentalis.
Corallorhiza corallorhiza.
Corallorhiza mertensiana.
Disporum oreganum.
**Galium bifolium.*
**Heuchera micrantha.*
**Kelloggia galioides.*
Leptaxis menziesii.
**Lycopodium annotinum.*
Lycopodium clavatum.
Lysias orbiculata.
Mitella caulescens.
**Monotropa hypopitys.*
Ophrys caurina.
Oxalis oregana.
**Oxalis trilliifolia.*
Pentstemon diffusus.
Phegopteris dryopteris.
Pyrola chlorantha.
Pyrola secunda.
Rudbeckia occidentalis.
**Sanguisorba latifolia.*
Saxifraga mertensiana.
Sedum oreganum.
Senecio triangularis.
**Streptopus roseus.*
Synthyris reniformis.
Therofon occidentale.
**Tiarella unifoliata.*
Trautvetteria grandis.
Vagnera sessilifolia.
Viola glabella.
Viola orbiculata.

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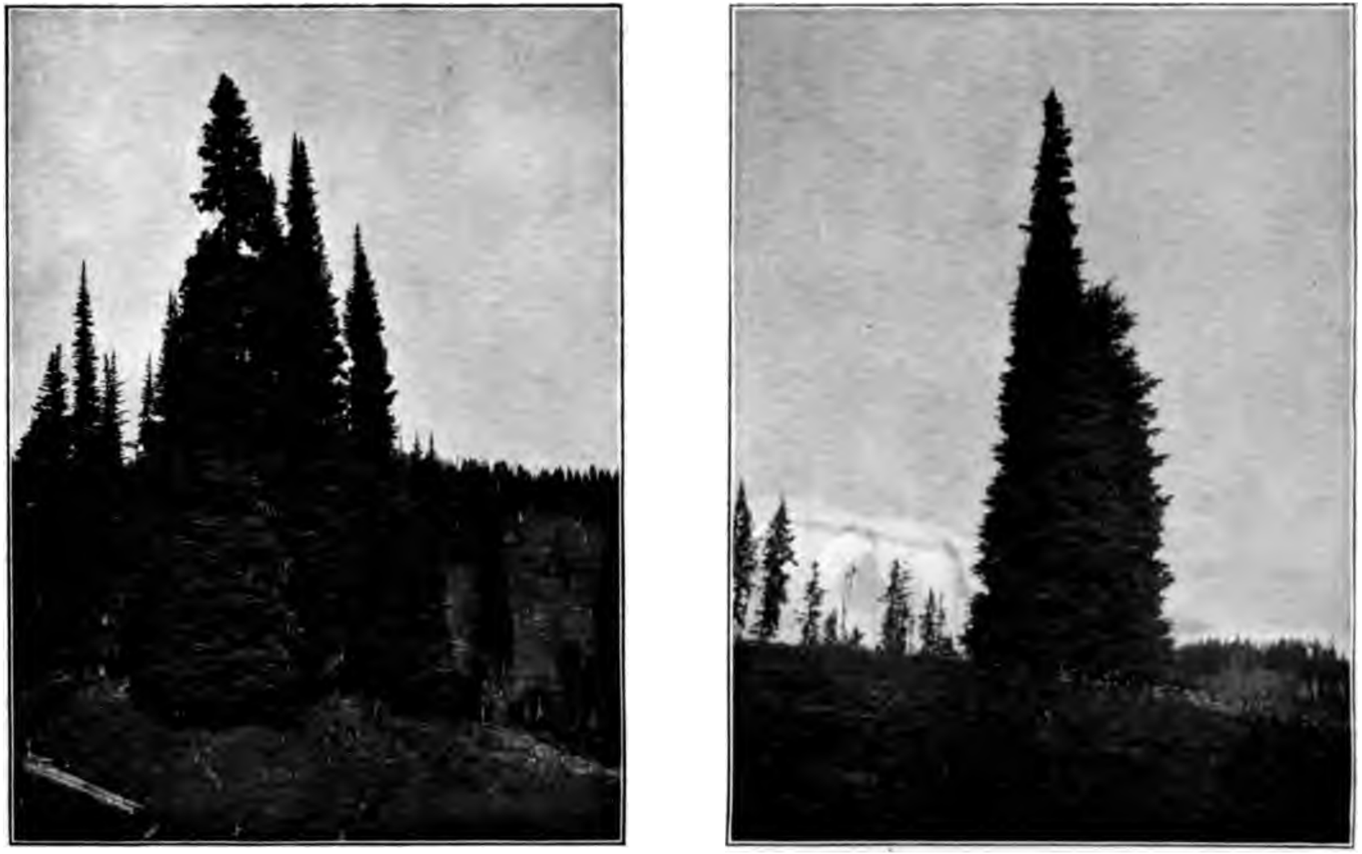
[a] The species marked with an asterisk are restricted to the Canadian zone.



SUBALPINE FIR (ABIES LASIOCARPA).

; the limit of the meadows in what have been called " pumice a very different series of plants appear. Among the more eristic are a lupine (*Lupinus lyallii*), the curious *Spraguea ta*, an Eriogonum (*E. coryphaeum*), *Oreastrum alpigenum*, *n aureus*, and *Polemonium elegans*.

ibove description applies particularly to the Arctic Zone in cade Mountains. The flora of the same zone in the Olympics similar, the principal differences being in the flora of the high-ts. In the Blue Mountains of Washington the Arctic Zone is nited in extent. The arctic flora of these last mountains is, r, about as closely related to that of the Rocky Mountains as of the Cascades.

following list shows the same comparative data as regards tion as were shown for Hudsonian species:

Distribution of characteristic Arctic-Alpine species.

Name of species.	Arctic regions.	Northern Cascades.	Olympic Mountains.	Mount Stuart.	Mount Rainier.	Mount Adams.	Mount St. Helens.	Mount Hood.	Blue Mountains.	Mount Shasta.	Sierra Nevada.	Rocky Mountains.	Mount Mazama.
pestris					x	x	x	x					
rantiaca		x	x		x	x	x	x	x			x	
milis		x	x		x	x			x			x	
sae		x	x		x	x			x			x	
idum					x				x		x	x	
cantha	x		x	x	x	x			x				
rummondii			x		x	x		x		x	x	x	
media			x	x	x	x	x	x	x	x		x	x
lanata			x	x	x	x			x			x	
a boreale	x	x			x			x					
olia						x					x	x	
lii		x	x		x	x		x	x			x	
nonticola					x							x	
apillaris	x	x	x	x	x	x					x	x	
uttallii					x	x			x		x	x	
janensis	x	x	x			x			x			x	
erna	x		x		x	x		x	x		x	x	
ryi		x	x		x	x			x			x	
viride	x	x		x									
uniflora						x		x	x	x	x	x	x
stis vaseyi			x		x	x							
ra	x		x			x	x	x					
osepala	x	x	x		x	x		x	x		x	x	
piperi			x										
scabrella						x					x		
bellidifolia	x				x	x				x	x	x	x
kamtschatica	x	x	x		x								
eri					x	x		x		x		x	x
nata	x		x										
a	x	x	x		x	x					x	x	
ina		x		x	x	x						x	
icans	x	x	x		x	x			x			x	
naica	x	x	x		x	x			x		x	x	
tabilis	x	x	x		x	x	x	x	x			x	
acula						x					x		
reopola		x	x		x	x							
upicola					x								
uksdorfii						x		x					
negarrhiza				x					x			x	
a	x		x			x			x			x	
on jeffreyi		x	x		x	x			x			x	
aevigata			x		x			x					
ola					x						x		
noni						x			x			x	
hocarpa			x		x	x						x	

Distribution of characteristic Arctic-Alpine species—Continued.

Name of species.	Arctic regions.	Northern Cascades.	Olympic Mountains.	Mount Stuart.	Mount Rainier.	Mount Adams.	Mount St. Helens.	Mount Hood.	Blue Mountains.	Mount Shasta.	Sierra Nevada.	Rocky Mountains.	Mount Mazama.
Dryas octopetala	x	x			x				x			x	
Empetrum nigrum	x		x		x			x				x	
Epilobium alpinum	x	x	x		x	x		x	x		x	x	
Epilobium anagallidifolium	x	x	x		x	x		x	x		x	x	
Epilobium clavatum		x	x		x	x		x		x	x	x	
Erigeron acris debilis		x	x			x			x			x	
Erigeron aureus				x	x								
Erigeron bloomeri									x		x		
Erigeron compositus		x	x	x	x	x			x	x		x	x
Erigeron leibergii				x									
Erigeron salsuginosus	x	x	x		x	x		x				x	
Erigeron uniflorus	x	x										x	
Eriogonum coryphaeum		x			x	x	x	x		x			x
Eriogonum minimum				x									
Eriogonum piperi									x			x	
Eriogonum umbellatum		x		x		x		x			x	x	x
Eritrichum howardi				x								x	
Erysimum arenicola			x										
Festuca viridula		x			x	x		x	x		x	x	
Festuca ovina supina	x	x	x		x	x	x	x			x	x	
Gentiana calycosa		x	x		x	x		x	x			x	
Gilia debilis				x	x	x	x	x	x			x	
Hedysarum americanum			x									x	
Hedysarum sulphurescens		x										x	
Hesperogenia stricklandi					x								
Heuchera racemosa		x	x		x	x							
Hieracium gracile	x	x			x	x		x	x	x		x	x
Hippuris montana	x		x		x								
Hoorebekia lyallii		x		x		x			x			x	
Hulsea nana					x	x			x	x	x		x
Hypericum bryophytum		x	x	x	x								
Ivesia gordoni				x		x			x		x	x	
Juncoides divaricatum							x				x		
Juncoides spicatum	x			x	x	x						x	
Juncus mertensianus	x	x	x	x	x	x		x	x			x	x
Juncus parryi		x	x		x	x		x		x		x	x
Juncus subtriflorus	x	x	x	x	x	x		x				x	x
Leptotaenia watsoni				x									
Lesquerella occidentalis						x				x			
Lewisia columbiana		x	x	x	x		x	x					
Lewisia nevadensis				x		x			x		x	x	
Lewisia triphylla						x			x		x	x	x
Lewisia tweedyi		x		x									
Lewisia pygmaea		x			x	x					x	x	
Lloydia serotina	x	x	x						x			x	
Lomatium angustatum			x		x	x	x	x					
Lutkea pectinata	x	x	x		x	x		x	x	x			x
Lupinus lyallii		x			x	x	x						
Lupinus volcanicus					x								
Lycopodium selago	x	x	x		x								
Lycopodium sitchense	x	x	x		x	x	x						
Mimulus alpinus			x		x	x			x			x	
Mimulus rubellus					x	x			x				
Oreastrum alpigenum				x	x	x	x	x		x			
Orthocarpus imbricatus			x								x		
Oxyria digyna	x	x	x		x	x		x		x		x	x
Pedicularis contorta			x		x				x			x	
Pedicularis ornithorhyncha		x		x	x								
Pentstemon menziesii		x	x		x	x	x	x		x			x
Petasites frigida	x	x	x		x								
Phaca hookerianus			x						x		x		
Phaca suksdorfii						x							
Phacelia sericea	x		x		x	x			x			x	
Phegopteris alpestris	x	x	x		x	x			x		x		
Phleum alpinum	x	x	x	x	x	x		x	x	x		x	x
Phlox condensata			x			x						x	
Phlox diffusa		x	x	x	x	x	x	x	x	x			x
Phlox douglasii						x		x	x	x	x	x	
Phyllodoce glanduliflora	x	x	x		x	x	x	x				x	x
Pinguicula vulgaris	x	x	x		x	x						x	
Poa alpina	x	x							x			x	
Poa lettermani					x							x	
Poa paddensis		x	x		x	x		x	x				
Poa suksdorfii				x	x	x							

Distribution of characteristic Arctic-Alpine species—Continued.

Name of species.	Arctic regions.	Northern Cascades.	Olympic Mountains.	Mount Stuart.	Mount Rainier.	Mount Adams.	Mount St. Helens.	Mount Hood.	Blue Mountains.	Mount Shasta.	Sierra Nevada.	Rocky Mountains.	Mount Mazama.
Polemonium elegans					x	x							
Polygonum minimum	x	x	x		x	x		x	x		x		
Polygonum newberryi				x	x	x	x	x		x			x
Polygonum viviparum	x	x							x			x	
Polystichum lemmoni				x							x		
Polystichum lonchitis	x	x	x	x	x	x		x	x			x	
Potentilla dissecta					x	x			x		x	x	
Potentilla flabellifolia		x	x		x	x		x	x	x	x		x
Potentilla villosa	x		x		x								
Pulsatilla occidentalis	x		x		x			x		x	x		x
Ranunculus eschscholtzii	x	x	x	x		x		x	x			x	x
Ranunculus suksdorfii		x			x	x			x				
Ranunculus verecundus					x								
Salix nivalis					x				x			x	
Salix tenera		x			x							x	
Saxifraga adscendens	x	x										x	
Saxifraga bongardi	x	x	x		x	x		x	x		x	x	x
Saxifraga caespitosa	x		x		x							x	
Saxifraga debilis					x				x			x	
Saxifraga nelsoni	x		x		x								
Saxifraga tolmiei		x			x	x	x	x		x	x		x
Sibbaldia procumbens	x	x	x	x	x	x			x	x		x	
Sieversia rossii	x	x		x					x			x	
Silene acaulis	x	x	x		x				x			x	
Silene lyallii		x	x	x	x	x							
Silene suksdorfii				x	x	x		x		x			
Sitanion rigidum		x	x		x	x		x	x		x		
Smelowskia calycina	x		x	x		x			x			x	
Smelowskia ovalis			x		x	x					x		
Spiraea hendersoni			x										
Spraguea umbellata		x			x	x	x	x	x	x		x	x
Thlaspi alpestre					x			x	x		x	x	
Trisetum spicatum	x	x	x		x	x	x	x	x		x	x	x
Veronica alpina	x		x		x	x		x	x			x	x
Veronica cusickii		x		x	x	x			x	x	x		
Viola flettii			x										
Zygadenus elegans		x	x						x			x	

REGIONS OF PECULIAR BOTANIC INTEREST.

In a State where conditions are so diverse as in Washington, and where practically every locality that has been carefully explored contains species of apparently very limited range, it is difficult to say which places have transcendent botanical interest. Where, however, the local massing of species of narrow range can be associated with more or less definite environmental conditions, the phenomenon is worth especial consideration. The following areas thus deserves special attention.

THE OLYMPIC MOUNTAINS.

The most striking peculiarities as regards these mountains, botanically considered, are the excessive rainfall on their southern and western slopes, and their isolated position. The heavy moisture precipitation results in modifying greatly the effect of altitude, so that the lines of zonal demarcation are much obscured. Many Humid

Transition species ascend even to the Hudsonian zone, producing thus a strange mixture of lowland and subalpine plants.

From the isolated position of these mountains together with their considerable elevation, some peculiarities would naturally be presupposed. The flora is, however, exceedingly similar to that of the Cascade Mountains. One misses, to be sure, a few conspicuous Cascade inhabitants, such as *Saxifraga tolmiei*, *Lupinus lyallii*, *Gentiana calycosa*, and *Eucephalus ledophyllus*, but the great majority of the plants are the same as those of the Cascades. The species which are not of the Cascade Mountains present, however, some interesting problems. Up to the present time there are only about ten species known to be peculiar to the Olympics, and these are all species of high altitude and most of them abundant as to individuals. They are as follows:

Aster paucicapitatus.
Campanula piperi.
Epilobium mirabile.
Erysimum arenicola.
Polemonium amoenum.
Senecio flettii.
Spiraea hendersoni.
Synthyris pinnatifida tomentosa.
Viola flettii.

Campanula piperi is nearly related to an Alaskan species. The others have their nearest relatives in Cascade and Sierra forms.

Some few species have a strangely isolated station in the Olympics. *Phaca hookeriana*, a species of the mountains of northern California and adjacent Nevada, also occurs in the Blue Mountains and then, apparently vaulting the Cascades, reappears in the Olympics.

Synthyris pinnatifida tomentosa likewise has no close relative except in the Wasatch and Rocky Mountains.

Thermopsis montana, collected in Chehalis County, is not otherwise known west of the eastern border of Washington.

Therofon majus intermedium is a subspecies whose parent species occurs in southeastern Oregon and California, and strangely enough reappears in abundance in the Bitterroots, though unknown in the Blue Mountains.

Hedysarum boreale, a very abundant species in the Olympics, is not known from the Cascades at all, though occurring in the northern Rockies and eastward to New England. In the northern Cascades and in the Bitterroots appears the closely related species *H. sulphurescens*.

Heuchera racemosa is an abundant species in the higher Olympics. Otherwise it is a very rare plant, on Mount Adams and on Mount Rainier.

Further explorations of these mountains are likely to disclose other peculiar species. These should be sought especially on the highest peaks.

THE COLUMBIA GORGE.

The wonderful gorge of the Columbia River (Pl. XVIII), extending a distance of about 50 kilometers (38 miles), presents peculiarities scarcely paralleled elsewhere in the Pacific northwest. The cliffs, rising hundreds of meters vertically, present almost every rupestrine condition. Some of them are in almost perpetual shadow, others subjected to bright sunshine. Some become dry almost with the cessation of the spring rains, others are bathed constantly in the spray of waterfalls. There are thus furnished suitable conditions, both to species from the arid interior and to others that normally flourish only in cool mountain valleys. The resultant association of Canadian or even Hudsonian species with those of the Transition zones is strikingly peculiar.

That such an unusual environment should be the habitat of a considerable number of species not found elsewhere might have been predicted. No less than 16 species are practically confined to this region. They are:

Agrostis howellii.
Calamagrostis howellii.
Delphinium trolliifolium.
Dodecatheon dentatum.
Erigeron howellii.
Erigeron oreganus.
Hemieva violacea.
Hieracium longiberbe.
Lomatium sp. nov.
Mimulus alsinoides.
Pentstemon barrettae.
Poa multnomae.
Sullivantia oregana.
Tellima odorata.
Valerianella aphanoptera.
Viburnum ellipticum.

Some few others are worthy of special mention. *Bolandra oregana*, otherwise confined to the Columbia gorge, reappears on the bluffs of Snake River in Wallowa County, Oreg.

Synthyris reniformis, abundant on the Oregon side of the gorge almost at the river's edge, has its real home in the Canadian and Hudsonian zones of the Blue and Bitterroot mountains. Like several other species, it does not occur on the Washington side of the Columbia gorge.

A number of the Canadian and Hudsonian species that descend into the Columbia gorge are more or less modified from their original forms and may be regarded as subspecies, when compared with the alpine forms. Such are:

Romanzoffia sitchensis.
Saxifraga bronchialis.
Saxifraga caespitosa.
Saxifraga occidentalis.
Valeriana sitchensis.

But a larger number preserve their identity beyond question. Such are:

Carex macrochaeta.
Chelone nemorosa.
Cornus canadensis.
Douglasia laevigata.
Pentstemon diffusus.
Pentstemon rupicola.
Polypodium hesperium.
Tofieldia intermedia.

KLICKITAT COUNTY.

A considerable number of species reach their northernmost extension in Klickitat County or in adjacent Skamania County and are not otherwise known to occur in Washington. In some cases a long distance to the southward intervenes before the species again occurs. This local northern distribution is perhaps due to the association of Humid and Arid Transition conditions and a warm southern slope exposure, the resultant combination being highly peculiar.

The species to which the above remarks apply are:

Arnica eradiata.
Azolla caroliniana.
Bromus orcuttianus.
Ceanothus prostratus.
Ceanothus thyrsiflorus.
Collinsia rattani.
Collinsia sparsiflora.
Cynoglossum grande.
Cypripedium fasciculatum.
Epilobium ursinum.
Eriogonum nudum.
Eryngium petiolatum.
Festuca confusa.
Garrya fremontii.
Gilia bolanderi.
Gilia divaricata.
Hemicarpha occidentalis.
Juncus uncialis.
Lepidium nitidum.
Melica fugax.
Mimulus douglasii.
Nemophila sepulta.
Orogenia linearifolia.
Panicum hirticaulon.
Piscaria setigera.
Plagiobothrys nothofulvus.
Polygonum austinae.
Polygonum greenei.
Scribneria bolanderi.
Tonella collinsioides.
Trifolium ciliolatum.
Viburnum ellipticum.
Viola sheltoni.

Some of these species will perhaps be found in Washington outside of Klickitat County, but the flora is well enough explored to make it quite certain that this will be the case with but few of them.

MOUNT STUART AND THE WENACHE MOUNTAINS.

Mount Stuart, a tall granitic peak in Kittitas County, and the surrounding Wenache Mountains, have long been of peculiar interest botanically, owing to the considerable list of species which are there localized. This peculiar localization of species, several of them without close relatives, seems to be in a measure associated with the granitic character of the region. Recent investigations have shown that most of the species occur also to the northward, but that they are confined almost entirely to granitic soils of the crest of the Cascades.

Among the species thus restricted are the following:

Arabis whitedii.
Cacaliopsis nardosmia glabrata.
Calamagrostis tweedyi.
Calochortus lyallii.
Castilleja elmeri.
Cymomarathrum brandegei.
Delphinium viridescens.
Delphinium xantholeucum.
Douglasia dentata.
Erigeron leibergii.
Leptotaenia watsoni.
Lewisia tweedyi.
Pedicularis ornithorhyncha.
Poa canbyi.

Rainiera stricta.
Rudbeckia alpicola.
Saxifraga apetala.
Senecio elmeri.
Solidago caurina.
Sphaeralcea longisepala.
Spiraea cinerascens.
Valeriana columbiana.

This extremely restricted range of so considerable a number of species in a mountain chain which would seem to offer no barrier to their extension southward is perhaps due primarily to the fact that the greater portion of the Cascade system from Mount Rainier southward is volcanic. Indeed, the eruption of the igneous rocks not only may have brought about the isolation of the plants above mentioned, but, through their preference for granitic soils, may have kept them from spreading southward. This idea further obtains support in the fact that there are some striking similarities between the flora of the Mount Stuart region and that of the Klamath region in southwestern Oregon, which is also largely granitic in character.

This is exemplified by a number of species which do not occur in the intermediate region. Among them are—

Arabis suffrutescens.
Bikukulla uniflora.
Campanula scabrella.
Chaenactis nevadensis.
Hoorebekia greenei.
Kelloggia galioides.
Ledum glandulosum.

To these should perhaps be added *Cacaliopsis nardosmia glabrata* and *C. nardosmia*, *Luina hypoleuca*, and *L. hypoleuca californica*.

Facts to be adduced hereafter in connection with the make-up of the flora of the Blue Mountains emphasize still more the above conclusions.

While a great portion of the plants of the Cascade and the Blue mountains are identical, there are nevertheless many species whose occurrence in the former mountains is so local that their recurrence in the latter furnishes some strikingly peculiar facts. As before stated, the central and southern portions of the Cascade system are composed of recent volcanic rocks, while the northern portion and the Siskiyou and other mountains of the Klamath region contiguous to the southern end of the Cascades are made up of older rocks, largely granite. This difference in geological structure seems to be directly associated with the distribution of certain plants here discussed. The facts of the distribution are, first, that there are species in common between the northern Cascades and the Klamath region which are absent in the intermediate portion of the Cascades; second, that certain species occur only in the Blues and the Klamath region or the northern Sierras; third, that others occur only in the northern Cascades and the Blues; and finally some species occur in all three regions, but not elsewhere.

SPECIES COMMON TO THE NORTHERN CASCADES AND THE BLUE MOUNTAINS.[a]

*_Angelica canbyi._
Angelica lyallii.
*_Castilleja oreopola._
Claytonia megarrhiza. (Also on Mount Jefferson.)
*_Dodecatheon tetrandrum._
Frasera speciosa.
*_Hoorebekia hirta._
Hoorebekia lyallii.
Lewisia pygmaea.
*_Nemophila breviflora._
Parnassia fimbriata.
*_Pedicularis contorta._
Polygonum alpinum.
*_Ranunculus suksdorfii._
Rhododendron albiflorum.
Rumex paucifolius.
Sambucus melanocarpa.
*_Silene oregana._

SPECIES COMMON TO THE BLUE MOUNTAINS AND THE NORTHERN SIERRAS AND KLAMATH REGION.[b]

Arenaria aculeata.
*_Asclepias cryptoceras._
*_Aster bloomeri._
Calochortus eurycarpus.
Carduus ochrocentrus.
Caulanthus hastatus.
Cercocarpus ledifolius.
Coleosanthus microphyllus.
Draba lemmoni.
*_Erigeron austinae._
*_Erigeron bloomeri._
Galium bifolium.
*_Gentiana simplex._
Gilia micromeria.
Gilia tenerrima.
Ivesia baileyi.
Oenothera scapoidea.
*_Pellaea breweri._
*_Phaca bolanderi._
Physaria newberryi.
Poa bolanderi.
*_Potentilla breweri._
*_Salix lemmoni._
*_Sedum debile._
*_Smelowskia fremontii._
Sphaerosciadium capitellatum.
Thalictrum fendleri.
*_Trifolium beckwithii._
*_Trifolium plummerae._

SPECIES COMMON TO THE MOUNT STUART REGION, THE BLUE MOUNTAINS, AND THE KLAMATH REGION.[c]

Agoseris retrorsa.
*_Arabis lemmoni._
*_Arabis suffrutescens._
Bikukulla uniflora.
*_Bromus suksdorfii._
Claytonia megarrhiza.
Cordylanthus capitatus.
Ericameria nana.
Eupatorium occidentale.
*_Hoorebekia greenei._
*_Hoorebekia greenei mollis._
Ivesia gordoni.
Ledum glandulosum.
Lewisia triphylla.
*_Melica fugax._
Melica stricta.
Spiraea densiflora.
Spraguea umbellata.
Stipa lemmoni.
*_Veronica cusickii._
*_Viola beckwithii._
Viola purpurea.

No especial attempt has been made to determine what species are absent from the Blue Mountains which might be expected to occur there. It is especially striking, however, that all the forest trees of the adjoining Bitterroots reach the Blues excepting the higher alpine *Larix lyallii* and the giant cedar (*Thuja plicata*). The absence of the last tree is the more marked as it is common throughout the Bitterroots, even on most of the outlying peaks.

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[a] Species marked with an asterisk are confined to the above regions.
[b] Species marked with an asterisk are confined to these three regions.
[c] Species marked with an asterisk are confined to these two regions.

Some few other plants common in the Bitterroots are likewise absent from the Blues. Among them are *Frasera fastigiata*, *Mitella stauropetala*, *Pentstemon pinetorum*, *Coptis occidentalis*, and *Asarum caudatum*.

The explanation of this peculiar interrelation in the floras of these distant mountains is probably to be sought in two facts. First, these mountain regions are alike in being composed wholly or largely of granite rocks; second, the intervening portion of the Cascades is wholly made up of volcanic rocks.

THE BLUE MOUNTAINS.

The greater part of this range lies within the State of Oregon. Its central portion, known as the Powder River Mountains, consists of granitic peaks which rise to an altitude of 2,400 to 2,700 meters (7,000 to 9,000 feet). Surrounding this granite center are lower mountains composed wholly of basalt. Such is the case with the portion which extends into Washington.

Occupying as they do a nearly central position in the Columbia Basin, quite widely separated from the Cascade Mountains to the westward and the scattered mountains southward, while almost contiguous to the outlying ranges of the Bitterroots to the east, peculiarities in the constitution of the flora of these mountains would be expected. That such is the case was recognized by their earliest explorer, Douglas, who made no less than three trips into this rather unique region.

The general facies of the flora is that of all the other mountains surrounding the Columbia basin. The great majority of the plants are identical with those of the eastern slope of the Cascade Mountains and scarcely a smaller proportion with those of the adjacent mountains in Idaho.

An analysis of the remaining portion of the Blue Mountains flora shows that it consists of several elements of diverse origin which combine to make it peculiar. These elements are, first, those species that are known to occur only in the Blue Mountains; second, those species which are common to the Rocky Mountains but which do not reach the Cascades, and third, those species which are also of more or less local distribution in the Cascade Mountains.

The plants known to be limited in distribution to the Blue Mountains are neither numerous nor strikingly different from their nearest relatives. In themselves they indicate scarcely more than that their origin is comparatively recent. It is worthy of note that a large proportion of them are habitants of the higher granitic portions of the mountains. The list is as follows:

SPECIES CONFINED TO THE BLUE MOUNTAINS.

Allium collinum.
Allium macrum.
Allium madidum.
Aragallus cusickii.
Calamagrostis cusickii.
Castilleja cusickii.
Castilleja rubida.
Castilleja rustica.
Draba cusickii.
Elymus nitidus.
Erigeron chrysopsidis.
Erigeron membranaceus.
Eriogonum strictum.
Frasera cusickii.
Lappula hispida.
Lathyrus cusickii.
Lathyrus rigidus.
Lomatium cusickii.
Lomatium oreganum.
Lupinus cusickii.
Lupinus sabinei.
Lupinus sulphureus.
Madia ramosa.
Pentstemon cusickii.
Pentstemon venustus.
Phaca cusickii.
Physaria oregana.
Potentilla brevifolia.
Primula cusickiana.
Pteryxia foeniculacea.
Pteryxia thapsoides.
Quamasia cusickii.
Ranunculus populago.
Senecio condensatus.
Sitanion latifolium.
Townsendia alpigena.

The Rocky Mountain element consists of a considerable number of species, including some genera which otherwise do not occur in Washington or Oregon. Most of these are confined to the higher granitic peaks, very few occurring within Washington limits. The presence of this Rocky Mountain element is undoubtedly a direct result of immediate contiguity, though the species may have been isolated on these remote peaks for a long period. It is noteworthy that a number of the list reach the Sierra Nevada but not the Cascades. The species are as follows:

SPECIES THAT OCCUR ALSO IN THE ROCKIES BUT NOT IN THE CASCADES.

Androsace septentrionalis.
Anemone parviflora.
Arabis microphylla.
Aster elegans.
Aster integrifolius.
Aster scopulorum.
Carex hystricina.
Conioselinum scopulorum.
Corallorhiza corallorhiza.
Draba alpina.
Draba glacialis.
Erigeron armeriaefolius.
Erigeron coulteri.
Eriogonum piperi.
Eritrichium elongatum.
Galium bifolium.
Hedysarum mackenzii.
Lepidium montanum.
Leucocrinum umbellatum.
Ligusticum tenuifolium.
Peraphyllum ramosissimum.
Phaca aboriginum.
Phaca kentrophyta.
Polemonium confertum.
Pinus flexilis.
Salix fernaldii.
Senecio renifolius.
Thlaspi glauca.

PLANTS KNOWN TO OCCUR ONLY IN WASHINGTON.

There are 158 recognized species and 27 subspecies of vascular plants which have thus far been found only within the confines of Washington. They are as follows:

Agastache occidentalis.
Agropyron flexuosum.
Agropyron saxicola.
Agropyron spicatum puberulentum.
Allium crenulatum.
Alsine washingtoniana.
Ambrosia artemisiaefolia diversifolia.
Amelanchier cuneata.
Angelica canbyi.
Antennaria confinis.
Antennaria hendersoni.
Antennaria latisquama.
Antennaria leucophaea.
Antennaria tomentella.
Apocynum ciliolatum.
Arabis atrorubens.
Arabis subvillosa secunda.
Arabis whitedii.
Arnica betonicaefolia.
Artemisia atomifera.
Aster elmeri.
Aster wattii.
Atriplex zosteraefolia.
Cacaliopsis nardosmia glabrata.
Calamagrostis inexpansa barbulata.
Calamagrostis langsdorfii lactea.
Calamagrostis tweedyi.
Campanula piperi.
Capnorea fulcrata.
Capnorea villosula.
Carex nebraskensis ultriformis.
Carex paddoensis.
Castilleja angustifolia abbreviata.
Castilleja angustifolia whitedii.
Castilleja elmeri.
Castilleja levisecta.
Castilleja miniata dixonii.
Castilleja crispula.
Castilleja rupicola.
Castilleja suksdorfii.
Clematis suksdorfii.
Coelopleurum maritimum.
Crataegus piperi.
Crepis glareosa.
Crepis rostrata.
Cynomarathrum brandegei.
Delphinium viridescens.
Delphinium xantholeucum.
Douglasia dentata.
Drymocallis glabrata.
Epilobium mirabile.
Elymus condensatus pubens.
Elymus virescens.
Erigeron aureus.
Erigeron curvifolius.
Erigeron leibergii.
Erigeron poliospermus.
Eriogonum douglasii ramosum.
Eriogonum minimum.
Eriogonum tolmieanum.
Eriogonum umbellatum hypoleium.
Erysimum arenicola.
Eucephalus paucicapitatus.
Fragaria crinita.
Galium cymosum.
Hemieva violacea.
Hesperogenia stricklandi.
Heuchera glabella columbiana.
Heuchera racemosa.
Hookera bicolor.
Hydastylus borealis.
Hydastylus brachypus.
Hypericum bryophytum.
Isoetes echinospora flettii.
Isoetes minima.
Isoetes piperi.
Juncus columbianus.
Lappula ciliata.
Lappula cottoni.
Lappula hendersoni.
Lappula saxatilis.
Lathyrus obovatus stipulaceus.
Lathyrus pauciflorus tenuior.
Leptotaenia watsoni.
Lesquerella douglasii.

Ligusticum purpureum.
Lomatium macrocarpum artemisiarum.
Lomatium suksdorfii.
Lupinus alpicola.
Lupinus saxosus.
Lupinus subalpinus.
Lupinus subsericeus.
Lupinus volcanicus.
Madia exigua macrocephala.
Melica bella intonsa.
Mentzelia brandegei.
Mertensia canescens.
Mertensia infirma.
Mertensia laevigata.
Mertensia platyphylla.
Mitella micrantha.
Monardella discolor.
Monardella nervosa.
Navarretia klickitatensis.
Oreocarya celosioides.
Oreocarya leucophaea.
Oreocarya spiculifera.
Orthocarpus barbatus.
Oryzopsis hendersoni.
Pedicularis ornithorhyncha.
Pentstemon gairdneri hians.
Pentstemon pruinosus.
Pentstemon rupicola.
Pentstemon variabilis.
Phaca arrecta leibergii.
Phaca glareosa.
Phaca lyallii.
Phaca sclerocarpa.
Phaca serotina.
Phaca sinuata.
Phaca speirocarpa.
Phaca suksdorfii.
Phaca tweedyi.
Phacelia lenta.
Physaria geyeri.
Phlox lanceolata.
Phlox viridis.
Phlox whitedii.
Poa cottoni.
Poa curtifolia.
Poa leckenbyi.
Poa pachypholis.
Poa suksdorfii.
Polemonium amoenum.
Polemonium elegans.
Polemonium pectinatum.
Potentilla permollis.
Quamasia suksdorfii.
Rainiera stricta.
Ranunculus triternatus.
Ribes watsonianum.
Rubus hesperius.
Rudbeckia alpicola.
Saxifraga apetala.
Sedum divergens.
Senecio condensatus.
Senecio elmeri.
Senecio flettii.
Senecio foetidus.
Senecio fraternus.
Senecio vaseyi.
Silene suksdorfii.
Sitanion basalticola.
Sitanion latifolium.
Sitanion planifolium.
Sitanion rubescens.
Solidago caurina.
Sphaeralcea longisepala.
Sphaerostigma hilgardi.
Spiraea cinerascens.
Spiraea hendersonii.
Stipa comata intonsa.
Stipa elmeri.
Stipa thurberiana.
Symphoricarpos acutus.
Synthyris pinnatifida tomentosa.
Synthyris schizantha.
Talinum spinescens.
Teucrium occidentale viscidum.
Thelypodium streptanthoides.
Therofon majus intermedium.
Trillium crassifolium.
Utricularia intermedia.
Vaccinium deliciosum.
Vagnera racemosa brachystyla.
Valeriana columbiana.
Valerianella aphanoptera.
Valerianella mamillata.
Veratum caudatum.
Veronica allenii.
Viola flettii.
Viola trinervata.
Xanthium oligacanthum.

Two of the genera included above, Rainiera and **Hesperogenia**, are monotypic.

PLANTS WHICH PROBABLY WILL BE FOUND TO OCCUR IN WASHINGTON.

The following list consists of species which are known either to occur both in Oregon and British Columbia, or else to grow within 13 kilometers (10 miles) of the Washington boundary. Most of them will probably be found to occur in Washington localities:

Agrostis howellii Scribner. Rooster Rock, Oreg.
Allium cusickii S. Wats. Bluffs opposite Lewiston, Idaho.
Andromeda polifolia L. Priest Lake, Idaho.
Arnica aurantiaca Greene. Blue Mountains, Oreg., and Chilliwack, B. C.
Aster cordalenus Hend. Lake Cœur d'Alene, Idaho.
Aster lyalli A. Gray. Priest Lake.
Astragalus howellii A. Gray. Near The Dalles, Oreg.
Brachyactis frondosa (Nutt.) Gray. The Dalles, Oreg.
Carex interior Bailey. Chilliwack Valley, B. C.
Chiogenes hispidula (L.) Torr. & Gray. Priest Lake.
Cyperus houghtoni Torr. Upper Ferry, near Lewiston, Idaho.
Delphinium trolliifolium A. Gray. South bank of Columbia below Cascades.
Erigeron howellii A. Gray. Near the Cascades of the Columbia, Oreg.
Eriophorum angustifolium Roth. Chilliwack Valley, B. C.
Eupatorium purpureum L. Saturna Island, B. C.
Festuca reflexa Buckl. Portland, Oreg., and Vancouver Island.
Howellia aquatilis A. Gray. Sauvies Island, Oreg., and Kootenai County, Idaho.
Lepidium idahoense Heller. Lewiston, Idaho.
Lilaea subulata H. B. K. Oregon and Vancouver Island.
Lomatium donnellii Coult. & Rose. Near Lewiston, Idaho.
Microseris bigelovii A. Gray. Oregon and Vancouver Island.
Mimulus clivicola Greenman. Thatuna Hills, Idaho.
Mimulus scouleri Hook. Tongue Point, Oreg.
Mitella stauropetala Piper. Thatuna Hills, Latah County, Idaho.
Myosurus sessilis S. Wats. Near Arlington, Oreg.
Onoclea struthiopteris (L.) Hoffm. Saturna Island, B. C.
Poa invaginata Scribner & Williams. Mitchells Point, Oreg.
Salix prolixa Anders. Mouth of Fraser River, B. C.
Sanicula marilandica L. North Idaho.
Savastana macrophylla (Thurb.) Beal. Sauvies Island, Oreg.
Scirpus macounii Holm. Chilliwack Valley, B. C.
Sullivantia oregana Wats. Multnomah Falls, Oreg.

ANNOTATED CATALOGUE OF THE SPECIÈS OF VASCULAR PLANTS OF WASHINGTON.

POLYPODIACEAE. Fern Family.

- Indusium wanting, the sori naked.
  - Sori elongated, following the veins, often branched or netted.. Ceropteris (p. 76).
  - Sori round.
    - Leaves pinnatifid; sori large, on the tips of the veins..... Polypodium (p. 76).
    - Leaves ternate or twice to thrice pinnatifid; sori small, on the backs of the veins.............................. Phegopteris (p. 77).
- Indusium present.
  - Sori marginal covered by the more or less modified margin of the leaf (false indusium).
    - Sporangia on a marginal vein which connects the ends of the lateral veinlets.............................. Pteridium (p. 78).
    - Sporangia at or near the ends of unconnected veins.
      - False indusium continuous .... Pellaea (p. 78).
      - False indusium not continuous.
        - Sporangia on the under side of the false indusium.................................. Adiantum (p. 78).
        - Sporangia on the leaf surface beneath the false indusium .... Cheilanthes (p. 79).
  - Sori not marginal nor covered by a false indusium.
    - Fruit-bearing veins parallel to the midrib; sori linear.
      - Sori nearest to the margin; leaves of two sorts ..... Struthiopteris (79).
      - Sori nearest to the midrib; leaves all alike .... Woodwardia (p. 79).
    - Fruit veins not parallel to the midrib; sori not linear.
      - Sori oblong, on oblique veins.
        - Leaves pinnate, small, firm.................... Asplenium (p. 80).
        - Leaves bipinnate, large, flaccid................ Athyrium (p. 80).
      - Sori round.
        - Induslum conspicuous, peltate or reniform.
          - Leaves firm, coriaceous; indusium peltate.. Polystichum (p. 80).
          - Leaves membranaceous; indusium reniform. Dryopteris (p. 81).
        - Indusium inconspicuous, not peltate or reniform.
          - Indusium under the sorus, stellately divided. Woodsia (p. 82).
          - Indusium hooded, fixed by a broad base.... Filix (p. 82).

CEROPTERIS.

1. **Ceropteris triangularis** (Kaulf.) Underw. Bull. Torr. Club **29**: 630. 1902.

Gold-back fern.

Gymnogramme triangularis Kaulf. Enum. Fil. 73. 1824.

Gymnopteris triangularis Underw. Our Native Ferns ed. 6. 84. 1900.

Type locality: "Habitat in California." Collected by Chamisso.

Range: British Columbia to California and Arizona.

Specimens examined: San Juan Island, *Gardner* 392. Also reported from Eatonville, *Flett*, and from near Port Angeles.

Zonal distribution: Humid Transition.

POLYPODIUM.

- Leaves leathery; veins more or less netted........................... 1. *P. scouleri.*
- Leaves membranous; veins free.
  - Pinnae attenuate, acute or acuminate............................ 2. *P. occidentale.*
  - Pinnae short, obtuse.. 3. *P. hesperium.*

1. **Polypodium scouleri** Hook. & Grev. Icon. Fil. **1:** *pl. 56.* 1829.
LEATHER-LEAF POLYPODY.

Polypodium pachyphyllum D. C. Eaton, Am. Journ. Sci. II. **22:** 138. 1856.

TYPE LOCALITY: Not ascertained.

RANGE: British Columbia to California along the coast.

SPECIMENS EXAMINED: Granville, *Conard* 320; Fort Canby, *Bruner*, October 29, 1881.

ZONAL DISTRIBUTION: Humid Transition.

2. **Polypodium occidentale** (Hook.) Maxon, Fern Bull. **12:** 102. 1904.
LICORICE POLYPODY.

Polypodium vulgare occidentale Hook. Fl. Bor. Am. **2:** 258. 1840.

Polypodium falcatum Kellogg, Proc. Cal. Acad. **1:** 20. 1854.

TYPE LOCALITY: "On rocks and decayed wood, common near the confluence of the Columbia with the sea." Collected by Douglas.

RANGE: Alaska to California in the coast region.

SPECIMENS EXAMINED: Seattle, *Piper* 300; Port Ludlow, *Binns*, August 20, 1888; Clallam County, *Elmer* 2811; Grays Harbor, *Wilkes Expedition* 11; Castle Rock, *Piper*, October 31, 1901.

ZONAL DISTRIBUTION: Humid Transition.

3. **Polypodium hesperium** Maxon, Proc. Biol. Soc. Wash. **13:** 200. 1900.

TYPE LOCALITY: "In Coyote Cañon, Lake Chelan, Washington." Collected by Gorman.

RANGE: British Columbia to Montana and Arizona.

SPECIMENS EXAMINED: Olympic Mountains, *Piper*, August, 1895; Mount Rainier, *Piper*, August, 1895; Stehekin, *Whited* 1392; Horseshoe Basin, *Elmer* 703; without locality, *Vasey* 41; Cape Horn, *Piper* 5013, 5015; Mount Baldy, *Conard* 288; Kettle Falls, *Beattie & Chapman* 2225.

ZONAL DISTRIBUTION: Canadian to Arctic.

This species is the basis for the record of *Polypodium vulgare* L. in Suksdorf's List.

POLYPODIUM CALIFORNICUM Kaulf. (*Polypodium intermedium* Hook. & Arn.) is reported from the Columbia River, collected by Scouler, in Hooker's Flora **2:** 258. It is quite certain that there is a mistake here either as to locality or as to identity.

PHEGOPTERIS. BEECH FERN.

Plant densely tufted; leaves oblong-lanceolate, tripinnatifid............ 1. *P. alpestris.*
Plants spreading by rootstocks; leaves triangular.
  Leaves bipinnatifid; rachis winged.............................. 2. *P. phegopteris.*
  Leaves ternate, the stalked divisions pinnate or bipinnate; rachis wingless.. 3. *P. dryopteris.*

1. **Phegopteris alpestris** (Hoppe) Mett. Fil. Hort. Bot. Lips. 83. 1856.

Polypodium alpestre Hoppe, Taschenb. 216. 1805.

TYPE LOCALITY: European.

RANGE: British Columbia to Montana and California. Europe.

SPECIMENS EXAMINED: Cascade Mountains, latitude 49°, *Lyall* in 1859; Clallam County, *Elmer* 2806; Olympic Mountains, *Piper*, August, 1895; Mount Adams, *Henderson*, August 10, 1892; Mount Rainier, *Piper* 2111; Skagit Pass, *Lake & Hull* 658; Wenache region, 2,120 meters altitude, *Brandegee* 1222; Bridge Creek, *Elmer* 636.

ZONAL DISTRIBUTION: Arctic.

2. **Phegopteris phegopteris** (L.) Underw. Bull. Torr. Club **20:** 462. 1893.

Phegopteris polypodioides Fée, Gen. Fil. 243. 1850–52.

Polypodium phegopteris L. Sp. Pl. **2:** 1089. 1753.

Polypodium phegopteris minus Hook. Fl. Bor. Am. **2:** 258. 1840.

TYPE LOCALITY: "Habitat in Europae fagetis et in Virginia."

RANGE: Alaska to Labrador, south to Washington, Iowa, and Virginia. Europe. Asia.

SPECIMENS EXAMINED: Skamania County, *Suksdorf* 2035.

ZONAL DISTRIBUTION: Humid Transition.

3. **Phegopteris dryopteris** (L.) Fée, Gen. Fil. 243. 1850–52.
Polypodium dryopteris L. Sp. Pl. 2: 1093. 1753.
Polypodium dryopteris rigidius Hook. Fl. Bor. Am. 2: 259. 1840.
Type locality: European.
Range: Alaska to Newfoundland, south to Oregon, Colorado, and Virginia.
Specimens examined: Clallam County, *Elmer* 2813; Whidby Island, *Gardner* 372; Port Ludlow, *Binns*, June 18, 1889; Silverton, *Bouck* in 1899; Snoqualmie, *Parker*, August, 1892; Skagit Pass, *Lake & Hull* 659; Stevens Pass, *Sandberg & Leiberg* 778, *Whited* 1436; Horseshoe Basin, *Elmer* 732; without locality, *Vasey* in 1889; Davis Ranch, *Kreager* 212, 185; Ione, *Kreager* 404; Mount Carlton, *Kreager* 275.
Zonal distribution: Mostly Canadian.

ADIANTUM.

1. **Adiantum pedatum aleuticum** Rupr. Beitr. Pflanzenk. Russ. Reich. 3: 49. 1845.
Maiden-hair fern.
Adiantum pedatum rangiferinum Burgess, Proc. Roy. Soc. Canada 4^{4}: 11. 1887.
Type locality: Unalaska.
Range: Alaska to Quebec, south to California.
Specimens examined: Clallam County, *Elmer* 2809; Mount Stuart, *Sandberg & Leiberg* 820; Fish Lake, *Dunn*, August 8, 1900; Horseshoe Basin, *Lake & Hull* 661; *Elmer* 723; west Klickitat County, *Suksdorf* 2030; without locality, *Vasey* in 1889; Seattle, *Piper*.
Zonal distribution: Humid Transition to Canadian.

PTERIDIUM.

1. **Pteridium aquilinum pubescens** Underw. Our Native Ferns ed. 6. 91. 1900.
Bracken.
Pteris aquilina lanuginosa Bong. Mem. Acad. St. Petersb. VI. 2: 176. 1832, not *Pteris lanuginosa* Bory 1810.
Type locality: Sitka.
Range: Alaska to California and Arizona.
Specimens examined: Fish Lake, *Dunn*, August, 1900; Wenache Mountains, *Whited* 1416; Tumwater Canyon, *Sandberg & Leiberg* 520; Wawawai, *Beattie*, July 12, 1902; Clealum Lake, *Cotton* 1852.
Zonal distribution: Humid Transition, abundant; Arid Transition, occasional.

PELLAEA.

Veins manifest; leaves oblong, pinnate, the segments oblong, obtuse, not crowded.. 1. *P. occidentalis*.
Veins concealed; leaves ovate, tripinnate, the linear acute segments crowded.. 2. *P. densa*.

1. **Pellaea occidentalis** (E. Nelson) Rydberg, Mem. N. Y. Bot. Gard. 1: 466. 1900.
Pellaea atropurpurea occidentalis E. Nelson, Fern Bull. 7: 30. 1899.
Pellaea pumila Rydberg, Mem. N. Y. Bot. Gard. 1: 4. 1900.
Type locality: "In a cañon in the Laramie Hills," Wyoming.
Range: South Dakota to Wyoming and Washington.
Specimens examined: West Klickitat County, *Suksdorf* 2083.
Zonal distribution: Doubtful.

2. **Pellaea densa** (Brack.) Hook. Sp. Fil. 2: 150. 1858.
Onychium densum Brack. in Wilkes Exped. 16: 120. *t. 13.* 1854.
Type locality: "Oregon, on the banks of Rogue's River."
Range: British Columbia to Wyoming and California.
Specimens examined: Clallam County, *Elmer* 2810; Mount Stuart, *Elmer* 1105; *Sandberg & Leiberg* 821; Stehekin River, *Whited* 1385; Blue Mountains, *Horner* 526; without locality, *Vasey* in 1889.
Zonal distribution: Probably Hudsonian.

CHEILANTHES.

Leaf-blades glabrous above, bipinnate; ultimate segments mostly entire.. 1. *C. gracillima.*
Leaf-blades pubescent above, tripinnate or tripinnatifid; ultimate segments mostly crenate.. 2. *C. feei.*

1. **Cheilanthes gracillima** D. C. Eaton, Bot. Mex. Bound. 234. 1859. LACE FERN.

TYPE LOCALITY: "Cascade Mountains of Oregon at 7,000 feet altitude, lat. 44°." Collected by Newberry.

RANGE: British Columbia to Idaho and California.

SPECIMENS EXAMINED: Clallam County, *Elmer* 2814; Olympic Mountains, *Piper* 1054; Mount Adams, *Suksdorf* 521; Mount Stuart, *Brandegee* 1211; Stehekin River, *Whited* 1384; Lake Chelan, *Whited* 1396; Bridge Creek, *Elmer* 660; without locality, *Vasey* 37, 38.

ZONAL DISTRIBUTION: Arid Transition to Hudsonian.

2. **Cheilanthes feei** Moore, Index Fil. 38. 1857.

Myriopteris gracilis Fée, Gen. Fil. 150. 1850–52.
Cheilanthes lanuginosa Nutt.; Hook. Sp. Fil. 2: 99. 1858.
Cheilanthes gracilis Mett. Abh. Senck. Nat. Gesell. 3: 80. 1859–61, not Kaulf.

TYPE LOCALITY: "Habitat ad rupes circa Hillsboro, in America septentr."

RANGE: British Columbia to Illinois, south to Arizona and Texas.

SPECIMENS EXAMINED: Almota, *Piper* 1768, 1884.

ZONAL DISTRIBUTION: Upper Sonoran.

CRYPTOGRAMMA.

1. **Cryptogramma acrostichoides** R. Br. in Richards. Bot. App. 367. 1823.

TYPE LOCALITY: "In shady rocky woods, between lat. 56° and 60° north. (First found by Mr. Menzies at Nootka Sound.)"

RANGE: Alaska to the Great Lakes, Colorado, and California.

SPECIMENS EXAMINED: Clallam County, *Elmer* 2807; Mount Rainier, *Piper*, August, 1895; *Flett*, July, 1895; Mount Stuart, *Sandberg & Leiberg*, August 1, 1893; Skagit Pass, *Lake & Hull* 660; Stampede Tunnel, *Henderson*, July 27, 1892; Stevens Pass, *Sandberg & Leiberg* 781; mountains north of Ellensburg, *Brandegee* 1209; Lake Chelan, *Whited* 1390; Horseshoe Basin, *Elmer* 734; Davis Lake, *Kreager*, August, 1902; without locality, *Vasey* in 1889; Stehekin, *Griffiths & Cotton* 235; Cape Horn, *Piper* 5006, 4978.

ZONAL DISTRIBUTION: Hudsonian and Canadian.

STRUTHIOPTERIS.

1. **Struthiopteris spicant** (L.) Weiss, Pl. Crypt. 287. 1770. DEER FERN.

Osmunda spicant L. Sp. Pl. 2: 1066. 1753.
Lomaria spicant Desv. Mag. Gesell. Naturf. Fr. Berlin 5: 325. 1811.
Blechnum doodioides Hook. Fl. Bor. Am. 2: 263. 1840.

TYPE LOCALITY: "Habitat in Europa."

RANGE: Alaska to California. Europe. Asia.

SPECIMENS EXAMINED: Clallam County, *Elmer* 2803; Port Ludlow, *Binns*, August 20, 1889; Seattle, *Piper*, September, 1898; Stevens Pass, *Sandberg & Leiberg* 774; without locality, *Vasey* in 1889.

ZONAL DISTRIBUTION: Humid Transition.

WOODWARDIA.

1. **Woodwardia spinulosa** Mart. & Gal. Mem. Acad. Brux. 15^5: 64. 1842.

Woodwardia chamissoi Brack. in Wilkes Exped. 16: 138. 1854.

TYPE LOCALITY: Near Mount Orizaba, Mexico.

RANGE: British Columbia to California, Arizona, and Mexico.

SPECIMENS EXAMINED: Steilacoom, *Flett* in 1902.

ZONAL DISTRIBUTION: Humid Transition.

ASPLENIUM.

- Sori curved; leaves flaccid, bipinnate, 0.5 to 1 m. long .... 1. *A. cyclosorum.*
- Sori straight; leaves firm, 6 to 20 cm. long, simply pinnate.
  - Rachis brown; leaf segments oval .... 2. *A. trichomanes.*
  - Rachis green; leaf segments ovate .... 3. *A. viride.*

1. **Asplenium trichomanes** L. Sp. Pl. **2**: 1080. 1753. SPLEENWORT.

TYPE LOCALITY: European.

RANGE: Alaska to Nova Scotia, south to Arizona, Texas, and Alabama.

SPECIMENS EXAMINED: Snoqualmie Falls, *Parker*, August, 1892; Snoqualmie, *Hindshaw;* East Seattle, *Hindshaw;* west Klickitat County, *Suksdorf* 1228; Cape Horn, *Piper* 4971; Quinault, *Conard* 220; Kirkland, *Wittenmyer.*

ZONAL DISTRIBUTION: Humid Transition.

2. **Asplenium viride** Huds. Fl. Angl. 385. 1762.

TYPE LOCALITY: "Habitat in rupibus humidis in comitatibus Eboracensi et Westmorlandica," England.

RANGE: Alaska to Oregon, Colorado, and Vermont. Europe. Asia.

SPECIMENS EXAMINED: Wenache Region, *Brandegee* 1216; near Mou ker, *Flett.*

ZONAL DISTRIBUTION: Hudsonian or Arctic.

ATHYRIUM.

1. **Athyrium cyclosorum** Rupr. Beitr. Pflanzenk. Russ. Reich. **3**: 41. 1845.

TYPE LOCALITY: "Petropawlowsk! et Unalaschka! Kadiak!"

RANGE: Alaska to Nebraska and California. Kamchatka.

SPECIMENS EXAMINED: Olympia, *Henderson*, August 23, 1892; Stehekin, *Whited* 1387; Stevens Pass, *Sandberg & Leiberg* 771; Skagit Pass, *Lake & Hull*, August 24, 1892; without locality, *Vasey* in 1889; Clarks Springs, *Kreager* 34.

ZONAL DISTRIBUTION: Humid Transition to Canadian.

This species has commonly been referred to *A. filix-foemina* (L.) Roth, from which it appears amply distinct.

POLYSTICHUM.

- Leaves simply pinnate.
  - Leaf-stalk short; segments triangular or broadly lanceolate .... 1. *P. lonchitis.*
  - Leaf-stalk long; segments linear-lanceolate.
    - Leaves 60 to 90 cm. long, the segments not overlapping .... 2. *P. munitum.*
    - Leaves about 30 cm. long, the segments overlapping.. 2a. *P. munitum imbricans.*
- Leaves bipinnate or bipinnatifid.
  - Sori few; leaves bipinnate at base .... 3. *P. lemmoni.*
  - Sori numerous; leaves bipinnatifid at base .... 4. *P. scopulinum.*

1. **Polystichum lonchitis** (L.) Roth, Tent. Fl. Germ. **3**: 71. 1800. HOLLY FERN.

Polypodium lonchitis L. Sp. Pl. **2**: 1088. 1753.

Aspidium lonchitis Sw. Schrad. Journ. Bot. **1800**^{2}: 30. 1801.

TYPE LOCALITY: "Habitat in alpinis Helvetiae, Baldi, Arvoniae, Monspelii, Virginiae."

RANGE: Subarctic regions southward to California, Colorado, and Wisconsin. Europe. Asia.

SPECIMENS EXAMINED: Olympic Mountains, *Piper*, August, 1895; Mount Rainier, *Piper*, August, 1895; Goat Mountains, *Allen*, August 5, 1895; Skamania County, *Suksdorf* 2056; mountains near Ellensburg, *Brandegee* 1220; Fish Lake, *Dunn*, August 8, 1900; Bridge Creek, *Elmer* 659.

ZONAL DISTRIBUTION: Arctic and Hudsonian.

2. Polystichum munitum (Kaulf.) Presl, Tent. Pterid. 83. 1836.
Aspidium munitum Kaulf. Enum. Fil. 236. 1824.
Type locality: "Habitat in California." Collected by Chamisso.
Range: Alaska to Idaho and California.
Specimens examined: Clallam County, *Elmer* 2808; Montesano, *Heller* 4035; Seattle, *Piper*, December, 1893; head of Twisp River, *Whited* 38; Blue Mountains, *Piper*, July, 1896.
Zonal distribution: Humid Transition.

2a. Polystichum munitum imbricans (D. C. Eaton) Maxon, Fern Bull. 8: 30. 1900.
Aspidium munitum imbricans D. C. Eaton, Ferns N. Am. 1: 188. 1879.
Type locality: "In Plumas County" and "at Red Mountain, Mendocino County," California.
Range: Washington to California.
Specimens examined: Clallam County, *Elmer* 2815; Peshastin, *Sandberg & Leiberg*, July, 1893: Lake Chelan, *Whited* 1382; Horseshoe Basin, *Lake & Hull* 662; Tumwater Canyon, *Sandberg & Leiberg* 517; without locality, *Vasey* in 1889; Lake Chelan, *Gorman* 641.
Zonal distribution: Canadian or Hudsonian.

3. Polystichum lemmoni Underw. Our Native Ferns. ed. 6. 116. 1900.
Type locality: "Near Mt. Shasta, California."
Range: Alaska to California.
Specimens examined: Mount Stuart, *Elmer* 1114; *Sandberg & Leiberg* 812; *Brandegee* 1219.
Zonal distribution: Arctic.

4. Polystichum scopulinum (D. C. Eaton) Maxon, Fern Bull. 8: 29. 1900.
Aspidium aculeatum scopulinum D. C. Eaton, Ferns N. A. 2: 125. 1880.
Type locality: "In the Upper Teton Cañon in Eastern Idaho."
Range: Washington and Idaho to California.
Specimens examined: Mount Stuart, *Elmer* 1113; Mount Adams, *Henderson* in 1883; Horseshoe Basin, *Elmer* 707; west Klickitat County, *Suksdorf* 2084; Eatonville, *Flett*.
Zonal distribution: Canadian to Hudsonian.

Flett's Eatonville specimens were referred to *P. californicum* (D. C. Eaton) Underw., but that species is not known to occur in Washington.

DRYOPTERIS.

Veins simple or once forked; leaves glandular.................. 1. *D. oreopteris*.
Veins freely forking.
  Indusia with marginal glands.............................. 2. *D. spinulosa dilatata*.
  Indusia without marginal glands........................... 3. *D. filix-mas*.

1. Dryopteris oreopteris (Sw.) Maxon, Proc. U. S. Nat. Mus. 23: 638. 1901.
Aspidium oreopteris Sw. Schrad. Journ. Bot. 1800²: 35. 1800.
Polypodium montanum Vogler, Dissert. Polyp. Mont. 1781, not Lam. 1778.
Type locality: European.
Range: Alaska to Washington. Europe. Asia.
Specimens examined: Bridge Creek, *Elmer* 671.
Zonal distribution: Hudsonian.

2. Dryopteris spinulosa dilatata (Hoffm.) Underw. Our Native Ferns ed. 4: 116. 1893. Wood fern.
Polypodium dilatatum Hoffm. Deutsch. Fl. 2: 7. 1795.
Aspidium spinulosum dilatatum Hook. Brit. Fl. 444. 1830.
Type locality: Germany.
Range: Alaska to Labrador, south to California, Montana, and Virginia. Europe. Asia.
Specimens examined: Clallam County, *Elmer* 2804; Montesano, *Heller* 3919; Samish

Lake, *Suksdorf* 1029; Lake Cushman, *Henderson* 1206; Tacoma, *Flett* 140, 141; Skokomish Valley, *Kincaid*, May 17, 1892; Bridge Creek, *Elmer* 670; without locality *Vasey* 1889.

Zonal distribution: Humid Transition.

3. Dryopteris filix-mas (L.) Schott, Gen. Fil. 1834. Male fern.

Polypodium filix-mas L. Sp. Pl. **2**: 1090. 1753.

Aspidium filix-mas Sw. Schrad. Journ. Bot. **1800^2**: 38. 1801.

Type locality: "Habitat in Europae sylvis."

Range: Alaska to Labrador, south to California, Michigan, and Nova Scotia. Europe. Asia.

Specimens examined: Falcon Valley, *Suksdorf* 1230.

Zonal distribution: Humid Transition.

FILIX.

1. Filix fragilis (L.) Underw. Our Native Ferns ed. 6. 119. 1900. Bladder fern.

Polypodium fragile L. Sp. Pl. **2**: 1091. 1753.

Cystopteris fragilis Bernh. Schrad. Neu. Journ. Bot. 1^2: 27. 1806.

Type locality: European.

Range: Alaska to Labrador, south to California, Kansas, and Georgia.

Specimens examined: Clallam County, *Elmer* 2812; Mount Rainier, *Piper*, August 12, 1889, 2106; upper Naches River, *Henderson*, June 15, 1892; Mount Stuart, *Elmer* 1219; Stampede Pass, *Henderson*, July 26, 1892; Egbert Springs, *Sandberg & Leiberg* 351; Wenache Mountains, *Whited* 1075; Waitsburg, *Horner* 260; without locality, *Vasey* 49; Almota, *Piper*, May 2, 1897.

Zonal distribution: Transition to Arctic.

WOODSIA.

Leaves viscid-puberulent; lobes of the indusium broader at base........ 1. *W. scopulina.*
Leaves glabrous or nearly so; lobes of the indusium hair-like........... 2. *W. oregana.*

1. Woodsia scopulina D. C. Eaton, Can. Nat. II. **2**: 90. 1865.

Type locality: "Rocky Mountains near 40° north latitude, Parry, Hall and Harbour; Columbia River, Brackenridge; Frazer River, near 49° north latitude, Mrs. John Miles."

Range: Alaska to Ontario, Colorado, and California.

Specimens examined: Ellensburg foothills, *Elmer* 418; White Salmon, *Suksdorf* in 1879; Wenache River, *Brandegee* 1224; Rainbow Falls, *Whited* 1407; Stehekin, *Whited* 1391; Cascade Mountains, latitude 49°, *Lyall;* Spokane, *Dewart;* without locality, *Vasey* in 1889; Cape Horn, *Piper* 4975.

Zonal distribution: Transition, mostly arid.

2. Woodsia oregana D. C. Eaton, Can. Nat. II. **2**: 90. 1865.

Woodsia obtusa lyallii Hook. Syn. Fil. 48. 1868.

Type locality: "Dalles of the Columbia River, Major Raines; Rocky Mountains near 40° north latitude, Hall and Harbour."

Range: British Columbia to the Great Lakes, south to California, Arizona, and Nebraska.

Specimens examined: Mount Adams, *Suksdorf*, September, 1877, Rattlesnake Mountains, *Cotton* 422; Coulee City, *Piper* 3850; between Coulee City and Waterville, *Spillman*, May 27, 1896; Sprague, *Henderson*, May 30, 1892; Pullman, *Piper* 1734; without locality, *Vasey* in 1889; Davis Ranch, *Kreager* 218; near Spokane, *Kreager* 171; Coulee City, *Piper* 3850; Republic, *Beattie & Chapman* 2258.

Zonal distribution: Arid Transition.

OPHIOGLOSSACEAE.

Sterile portion of leaf simple, entire; veins netted........................ OPHIOGLOSSUM.
Sterile portion of leaf pinnately divided or compound; veins free........ BOTRYCHIUM.

OPHIOGLOSSUM.

1. **Ophioglossum vulgatum** L. Sp. Pl. **2**: 1062. 1753. ADDER'S TONGUE.

TYPE LOCALITY: "Habitat in Europae pratis sylvaticis."

RANGE: Washington to Arizona, Texas, and Maine. Europe. Asia.

SPECIMENS EXAMINED: Skamania County, *Suksdorf,* June 26, 1895; Falcon Valley, *Suksdorf* 1218.

ZONAL DISTRIBUTION: Humid Transition.

BOTRYCHIUM. GRAPE FERN.

Bud in a cavity at one side of the base of the stem; leaves thin, ternate, then pinnately much divided.. 1. *B. virginianum.*
Bud inclosed in the base of the stalk.
  Sterile portion of leaf arising near the base of the rather large plant. 2. *B silaifolium.*
  Sterile portion of leaf arising near the middle of the usually small plant.
    Green part of leaf oblong, its segments fan-shaped.
      Segments truncate at base, overlapping.................. 3. *B. lunaria.*
      Segments cuneate at base, distant .... 4. *B. onondagense.*
    Green part of leaf triangular or ovate, the segments not fan-shaped.
      Segments lanceolate, acute; midvein continuous.......... 5. *B. lanceolatum.*
      Segments oblong-ovate, obtuse; midvein dissipated...... 6. *B. neglectum.*

1. **Botrychium virginianum** (L.) Sw. Schrad. Journ. Bot. **1800**^{2}: 111. 1801.

Osmunda virginiana L. Sp. Pl. **2**: 1064. 1753.

TYPE LOCALITY: "Habitat in America."

RANGE: British Columbia to Labrador, south to Washington, Arizona, Texas, and Florida.

SPECIMENS EXAMINED: Seattle, *Piper* 906.

ZONAL DISTRIBUTION: Transition.

2. **Botrychium silaifolium** Presl, Rel. Haenk. **1**: 76. 1825.

Botrychium occidentale Underw. Bull. Torr. Club **25**: 538. 1898.

TYPE LOCALITY: "Hab. in Nootka-Sound."

RANGE: British Columbia and Washington.

SPECIMENS EXAMINED: Lake Cushman, *Henderson* 1852; Seattle, *Tarleton,* July, 1894; *Piper,* October, 1892; Lake Wenache, *Sandberg & Leiberg* 639; Usk, *Kreager* 360; Lake Chelan, *Elmer,* September, 1897.

ZONAL DISTRIBUTION: Humid Transition.

This species appears in Suksdorf's List as *Botrychium ternatum* Swartz.

3. **Botrychium lunaria** (L.) Sw. Schrad. Journ. Bot. **1800**^{2}: 110. 1801.

Osmunda lunaria L. Sp. Pl. **2**: 1064. 1753.

TYPE LOCALITY: European.

RANGE: Washington to Colorado and Labrador and northward. Europe. Asia.

SPECIMENS EXAMINED: Mount Rainier, *Smith,* October, 1888; Mount Adams, *Suksdorf,* July 11, 1886.

ZONAL DISTRIBUTION: Arctic.

The Mount Adams specimen is the basis for the inclusion of *Botrychium simplex* Hitchcock in Suksdorf's List.

4. **Botrychium onondagense** Underw. Bull. Torr. Club **30**: 47. 1903.
Type locality: Near Split Rock, Syracuse, New York.
Range: Washington, Montana, Michigan, and New York.
Specimens examined: Olympic Mountains at foot of Mount Steele, *Piper* 928.
Zonal distribution: Doubtful.

5. **Botrychium lanceolatum** (S. G. Gmel.) Ångs. Bot. Notiser 1854: 68. 1854.
Osmunda lanceolata S. G. Gmel. Nov. Comm. Acad. Sci. Petrop. **12**: 516. 1768.
Type locality: European.
Range: Washington to Colorado, Pennsylvania, and northward. Europe. Asia.
Specimens examined: Foot of Mount Rainier, *Allen*, August 2, 1899.
Zonal distribution: Probably Canadian.

6. **Botrychium neglectum** Wood, Classbook Bot. 635. 1847.
Type locality: "Growing in woods, Meriden, N. H."
Range. Alaska to Nova Scotia, south to Washington, South Dakota, and Maryland.
Specimens examined: Mount Adams, *Suksdorf* 1220.

MARSILEACEAE.

MARSILEA.

1. **Marsilea vestita** Hook. & Grev. Ic. Fil. *pl. 159.* 1832.
Type locality "Ad flumaen Columbiam, ora occidentali Americae Septentrionalis."
Range: British Columbia to Kansas and Arizona.
Specimens examined: Falcon Valley, *Suksdorf* 227; opposite mouth of Wenache River, *Watson* 470; west Klickitat County, *Suksdorf* 119; Columbia River Valley, *Brandegee* 1225; Wenache, *Whited* 1426; Pasco, *Hindshaw* 35; Lake Chelan, *Lake & Hull* 657; Pullman, *Piper* 1736; *Henderson* 2431; Almota, *Piper*, September 9, 1896; Sentinel Bluffs, *Cotton* 1347.
Zonal distribution: Upper Sonoran and Arid Transition.

SALVINIACEAE.

AZOLLA.

1. **Azolla caroliniana** Willd. Sp. Pl. **5**: 541. 1810.
Type locality: "Hab. in aquis Carolinae."
Range: British Columbia to Ontario, south to Florida and Mexico.
Specimens examined: West Klickitat County, *Suksdorf* 1216.
Zonal distribution: Upper Sonoran.

EQUISETACEAE.

EQUISETUM. Horsetail.

Stems evergreen, perennial; spike tipped with a rigid point.
  Plant tall and stout; stems many-grooved, 0.5 to 2 meters high.
    Stems rough-tuberculate, dark green.......................... 1. ***E. hyemale.***
    Stems smooth, pale.. 2. ***E. laevigatum.***
  Plants tufted, slender; stems 5 to 10-grooved.
    Sheaths 5 to 10-toothed; stems hollow........................ 3. ***E. variegatum.***
    Sheaths 3-toothed; stems solid................................ 4. ***E. scirpoides.***

Stems annual; spikes not mucronate.
Fertile stems pale-brown, short-lived; sterile with many branches.
Stems slender, 6 to 10-furrowed.............................. 5. *E. arvense.*
Stems stout, 20 to 40-furrowed............................... 6. *E. telmateia.*
Fertile stems green like the sterile, naked or branched.
Stems obscurely ridged; sheaths appressed................... 7. *E. fluviatile.*
Stems acutely ridged; sheaths loose.......................... 8. *E. palustre.*

1. Equisetum hyemale L. Sp. Pl. **2**: 1062. 1753. Scouring rush.

Type locality: "Habitat in Europae sylvis, asperis, uliginosis."

Range: British Columbia to New England, south to California and Georgia. Europe. Asia.

Specimens examined: West Klickitat County, *Suksdorf* 1243, 2161, 2162; Wenache, *Whited*, May 17, 1896; Waitsburg, *Horner*, February 1, 1897; Pullman, *Elmer* 294, July 2, 1896; Port Discovery, *Wilkes Expedition.*

Zonal distribution: Transition to Canadian.

Mr. A. A. Eaton considers that this variable species consists of several definable subspecies. Ours are thus classified:

Ridges with 2 rows of tubercles....................... *hyemale californicum* Milde.
Ridges with bands of silex.
Sheaths loose; stems stout.......................... *hyemale intermedium* A. A. Eaton.
Sheaths close; stems with fertile branches........ *hyemale suksdorfii* A. A. Eaton.

The first subspecies has commonly been referred to *E. robustum* A. Br.

2. Equisetum laevigatum A. Br. Am. Jour. Sci. **46**: 87. 1844.

Type locality: "On the banks of the river, below St. Louis," Missouri.

Range: British Columbia to New York, south to California, Texas, and Georgia.

Specimens examined: West Klickitat County, *Suksdorf* 2135; North Yakima, *Henderson* 2263 and May 26, 1892; White Salmon, *Suksdorf* 317; without locality, *Vasey*, 1889; Old Fort Colville, *Watson* 472; Pullman, *Piper* 1733 and June 20, 1893; Kiona, *Cotton* 735.

Zonal distribution: Arid Transition.

3. Equisetum variegatum Schleich. Cat. Pl. Helvet. 27. 1807.

Type locality: Switzerland.

Range: Arctic America, south to Nevada and Pennsylvania.

Specimens examined: West Klickitat County, *Suksdorf* 2099.

4. Equisetum scirpoides Michx. Fl. **2**: 281. 1803.

Type locality: "Hab. in vetustis sylvis Canadae."

Range: Alaska to Labrador, south to Washington, Illinois, and Pennsylvania.

Specimens examined: Box Canyon, *Kreager* 389; Ione, *Kreager* 405.

5. Equisetum arvense L. Sp. Pl. **2**: 1061. 1753.

Equisetum saxicola Suksdorf, Deutsch. Bot. Monatss. **19**: 93. 1901.

Type locality: "Habitat in Europae agris, pratis."

Range: Alaska to Greenland, south to California and New England. Europe. Asia.

Specimens examined: Everett, *Piper*, July, 1892; Skamania County, *Suksdorf* 2163; Falcon Valley, *Suksdorf* 1238; Pullman, *Piper*, May 15, 1893; *Elmer* 210, May, 1897.

Zonal distribution: Transition mainly.

6. Equisetum telmateia Ehrh. Hannov. Mag. 138. 1783.

Type locality: European.

Range: British Columbia to California. Europe.

Specimens examined: Seattle, *Piper*, July 10, 1895; March, 1892; upper Valley Nisqually, *Allen* 175; Wenache, *Whited* 19, May 17, 1895; near Bingen, *Suksdorf* 1237; White Salmon, *Suksdorf* 315.

Zonal distribution: Humid Transition.

7. **Equisetum fluviatile** L. Sp. Pl. 1: 1062. 1753.

Equisetum limosum L. loc. cit.

TYPE LOCALITY: "Habitat in Europa ad ripas lacuum, fluviorum."

RANGE: Alaska to Labrador, south to Washington and Virginia. Europe. Asia.

SPECIMENS EXAMINED: New London, *Lamb* 1203 and June 12, 1897; Lake Cushman, *Piper*, August, 1895; *Henderson* 1190; Skamania County, *Suksdorf* 2164 and August 17, 1892; Seattle, *Piper*, July 10, 1895.

ZONAL DISTRIBUTION: Humid Transition to Hudsonian.

One of Suksdorf's specimens was distributed and included in his list as *E. littorale* Kühle.

8. **Equisetum palustre** L. Sp. Pl. 2: 1061. 1753.

TYPE LOCALITY: "Habitat in Europae aquosis."

RANGE: Alaska to Nova Scotia, south to Washington and New York. Europe.

SPECIMENS EXAMINED: West Klickitat County, *Suksdorf* 46.

LYCOPODIACEAE.

LYCOPODIUM. CLUBMOSS.

Sporangia in the axils of ordinary leaves.
Sporangial leaves forming a terminal spike .... 1. *L. inundatum.*
Sporangial leaves subterminal, the terminal leaves sterile.
Stems rigid; leaves all alike, ascending .... 2. *L. selago.*
Stems not rigid; leaves spreading, of two sorts, long and short. 3. *L. lucidulum.*
Sporangia in the axils of modified leaves crowded in spikes.
Stems leafy up to the spikes or nearly so.
Leaves 6 to 8-ranked, spreading .... 4. *L. annotiunm.*
Leaves 5-ranked, appressed .... 5. *L. sitchense.*
Stems of the fruiting branches nearly naked.
Leaves all alike; stems cylindric .... 6. *L. clavatum.*
Leaves of two forms; stems flattened .... 7. *L. complanatum.*

1. **Lycopodium inundatum** L. Sp. Pl. 2: 1102. 1753.

TYPE LOCALITY: European.

RANGE: Washington to Newfoundland, south in the Alleghanies to Georgia. Europe. Asia.

SPECIMENS EXAMINED: Chambers Lake near Olympia, *Henderson* 2048; Spanaway Lake, *Flett.*

2. **Lycopodium selago** L. Sp. Pl. 2: 1102. 1753.

TYPE LOCALITY: European.

RANGE: Alaska to Labrador, south to Washington, Michigan, and Carolina. Europe. Asia.

SPECIMENS EXAMINED: Olympic Mountains, *Piper* 2232; Baldy Peak, *Lamb* 1390; Mount Baker, *Flett* 162; Snoqualmie Falls, *Parker*, August, 1892; Snoqualmie Pass, *Piper*, August, 1892; Stevens Pass, *Sandberg & Leiberg*, August, 1893; Bridge Creek, *Elmer* 686.

ZONAL DISTRIBUTION: Arctic.

3. **Lycopodium lucidulum** Michx. Fl. 2: 284. 1803.

TYPE LOCALITY: "Hab. a Canada ad Carolinam Montosam."

RANGE: British Columbia to New Brunswick, south to Washington, Iowa, and North Carolina.

SPECIMENS EXAMINED: Skykomish River, *Wittenmyer;* Stevens Pass, *Sandberg & Leiberg* 777; Mount Baldy, *Conard* 276.

ZONAL DISTRIBUTION: Canadian.

4. **Lycopodium annotinum** L. Sp. Pl. 2: 1103. 1753.

TYPE LOCALITY: European.

RANGE: Labrador to Alaska, south to Washington, Colorado, and New York. Europe. Asia.

SPECIMENS EXAMINED: Mount Rainier, *Piper* 2110; Big Meadows, *Kreager* 412.

ZONAL DISTRIBUTION: Canadian.

5. **Lycopodium sitchense** Rupr. Beitr. Pflanzenk. Russ. Reich. **3**: 30. 1845.

TYPE LOCALITY: Sitka.

RANGE: British Columbia to Labrador, south to Oregon and New York.

SPECIMENS EXAMINED: Clallam County, *Elmer* 2527; Olympic Mountains, *Lamb* 1398; *Piper*, August, 1895; Mount Rainier, *Piper* 2098; Stevens Pass, *Sandberg & Leiberg* 779; Horseshoe Basin, *Elmer*, September, 1897.

ZONAL DISTRIBUTION: Arctic.

This species has commonly, but erroneously, been referred to *L. alpinum* L.

6. **Lycopodium clavatum** L. Sp. Pl. **2**: 1101. 1753.

TYPE LOCALITY: European.

RANGE: Alaska to Labrador, south to Washington, Michigan, and North Carolina. Europe. Asia.

SPECIMENS EXAMINED: Clallam County, *Elmer* 2454; Port Ludlow, *Binns*, August 15, 1890; Silverton, *Bouck* 214; Mashel River, *Piper* 2105; Skamania County, *Suksdorf* 1030; Horseshoe Basin, *Elmer* 728; without locality, *Vasey* 1889.

ZONAL DISTRIBUTION: Humid Transition.

7. **Lycopodium complanatum** L. Sp. Pl. **2**: 1104. 1753.

TYPE LOCALITY: "Habitat in Europae and Americae septentrionalis sylvis acerosis."

RANGE: Alaska to Labrador, south to Washington, the Great Lakes, and Virginia.

SPECIMENS EXAMINED: Lake Keechelus, *Piper*, 1887; Stampede Pass, *Henderson* 2535; Big Meadows, *Kreager*, August, 1902; Box Canyon, *Kreager* 399.

ZONAL DISTRIBUTION: Canadian?

SELAGINELLACEAE.

SELAGINELLA.

Leaves of two sorts, the lateral ones much larger........................ 1. *S. douglasii.*
Leaves all alike.
  Stem flaccid, often very long; leaves not bristle-tipped .... 2. *S. struthioloides.*
  Stems rigid; leaves bristle-tipped.
    Leaves much crowded; stems 5 to 10 cm. long.............. 3. *S. densa.*
    Leaves less crowded; stems 10 to 30 cm. long................ 4. *S. rupestris.*

1. **Selaginella douglasii** (Hook.) Spring, Monog. **2** : 92. 1841.

Lycopodium douglasii Hook. & Grev. in Hook. Fl. Bor. Am. **2** : 268. 1840.

Lycopodium ovalifolium Hook. & Grev. Ic. Fil. *t. 177.* 1831, not Desv. 1823.

TYPE LOCALITY: "Hab. in oris occidentalibus Americae septentrionalis." Collected by Douglas.

RANGE: Washington to California.

SPECIMENS EXAMINED: Cape Horn, *Joseph Howell* 35; *Piper* 4965.

ZONAL DISTRIBUTION: Humid Transition.

2. **Selaginella struthioloides** (Presl) Underw. Bull. Torr. Club **25** : 132. 1898.

Lycopodium struthioloides Presl, Rel. Haenk. **1**: 82. 1830.

Selaginella oregana D. C. Eaton in Wats. Bot. Cal. **2** : 350. 1880.

TYPE LOCALITY: "Hab. in Nootka-Sund."

Range: Near the seacoast, British Columbia to Oregon.

Specimens examined: Southbend, *Piper* in 1900; Laban, *Piper* 3820; Quinault, *Conard* 174.

Zonal distribution: Humid Transition.

3. Selaginella densa Rydberg, Mem. N. Y. Bot. Gard. **1**: 7. 1900.

Type locality: "Little Rocky Mountains," Montana.

Range: Washington to Montana and Nebraska.

Specimens examined: Wawawai, *Piper*, May 26, 1894.

Zonal distribution: Arid Transition.

4. Selaginella rupestris (L.) Spring; Mart. Fl. Bras. 1^2: 118. 1840.

Lycopodium rupestrè L. Sp. Pl. **2**: 1101. 1753.

Type locality: "Habitat in Virginia, Canada, Siberia."

Range: British Columbia to New England, south to California and Georgia.

Specimens examined: Lillewaup, *Piper*, September, 1890; Klickitat County, *Suksdorf* 66; Cascade Mountains, latitude 49°, *Lyall* 1376; Cape Horn, *Piper* 4964.

Zonal distribution: Humid Transition.

In a recent paper by Hieronymus a large number of new species allied to *Selaginella rupestris* are proposed. Three of these are from Washington and Oregon, namely:

Selaginella haydeni Hieronymus, Hedwigia **39**: 296. 1904.

Selaginella wallacei Hieronymus, op. cit. 305.

Selaginella sartorii oregonensis Hieronymus, op. cit. 305.

The type of the last is one of the Lyall specimens above cited.

ISOETACEAE.

ISOETES. Quillwort.

Plants of shallow water or muddy places; leaves with stomata.
 Stems 3-lobed; leaves setaceous.
  Velum incomplete; megaspores spinulose............ 1. *I. minima.*
  Velum complete; megaspores warty................. 2. *I. nuttallii.*
 Stems 2-lobed; leaves not setaceous..................... 3. *I. howellii.*
Plants aquatic, often in deep water; stems bilobed.
 Stomata absent.
  Megaspores marked with irregular ridges............ 4. *I. paupercula.*
  Megaspores with low distinct warts.................. 5. *I. piperi.*
 Stomata present.
  Leaves erect; megaspores tuberculate................ 7. *I. bolanderi.*
  Leaves recurved.
   Megaspores spinulose; microspores smooth...... 6a. *I. echinospora braunii.*
   Megaspores tuberculate; microspores spinulose .. 6b. *I. echinospora flettii.*

1. Isoetes minima A. A. Eaton, Fern Bull. **6**: 30. 1898.

Type locality: Near Waverly, Washington. Collected by Suksdorf.

Specimens examined: Waverly, *Suksdorf.*

2. Isoetes nuttallii A. Br.; Engelm. Am. Nat. **8**: 215. 1874.

Isoetes suksdorfii Baker, Handbook Fern Allies 132. 1887.

Type locality: "On the Columbia." Collected by Nuttall.

Specimens examined: West Klickitat County, *Suksdorf* 917.

3. Isoetes howellii Engelm. Trans. St. Louis Acad. **4**: 385. 1882.

Isoetes nuda Engelm. l. c.

Isoetes underwoodii Henderson, Bot. Gaz. **23**: 124. 1897.

Type locality: "On the borders of ponds at The Dalles of the Columbia, Oregon." Collected by Howell.

RANGE: Washington, Oregon, and Idaho.

SPECIMENS EXAMINED: Cusick, Stevens County, *Piper* 4209; Lake Kalispel, *Kreager* 335.

4. **Isoetes paupercula** (Engelm.) A. A. Eaton, Proc. U. S. Nat. Mus. **23**: 649. 1901.
Isoetes lacustris paupercula Engelm. Trans. St. Louis Acad. **4**: 377. 1882.
Isoetes occidentalis Henderson, Bull. Torr. Club **27**: 358. 1900.
TYPE LOCALITY: Grand Lake, Middle Park, Colorado.
RANGE: Washington to California and Colorado.
SPECIMENS EXAMINED: Lake Chelan, *Gorman*.

5. **Isoetes piperi** A. A. Eaton, Fern Bull. **13**: 51. 1905.
TYPE LOCALITY: "Green Lake, near Seattle, Washington."
SPECIMENS EXAMINED: Green Lake, *Piper* 2317.

6a. **Isoetes echinospora braunii** (Durieu) Engelm. in A. Gray, Man. ed. 5. 676. 1867.
Isoetes braunii Durieu, Bull. Soc. Bot. France **11**: 101. 1864.
TYPE LOCALITY: Not ascertained.
SPECIMENS EXAMINED: Lake Chelan, *Elmer*, August, 1897; Ponds, Mount Rainier, *Piper* 131; Bitter Lake, *Piper* in 1890.

6b. **Isoetes echinospora flettii** A. A. Eaton, Fern Bull. **13**: 51. 1905.
TYPE LOCALITY: "Spanaway Lake," Pierce County, Washington.
SPECIMENS EXAMINED: Spanaway Lake, *Piper* 2125; *Flett* 949.

7. **Isoetes bolanderi** Engelm. Am. Nat. **8**: 214. 1874.
TYPE LOCALITY: Tuolumne, California.
RANGE: Washington and Idaho to California.
SPECIMENS EXAMINED: Mount Adams, *Suksdorf* 2375; Falcon Valley, *Suksdorf* 2370; Yakima region, *Brandegee*.

TAXACEAE. YEW FAMILY.

TAXUS.

1. **Taxus brevifolia** Nutt. Sylva **3**: 86. *pl. 108*. 1849. WESTERN YEW.

TYPE LOCALITY: "In the dense maritime forests of the Oregon." Collected by Nuttall.

RANGE: British Columbia, south to Tulare County, Cal., eastward to Montana and the Blue Mountains.

SPECIMENS EXAMINED: Nason City, *Sandberg & Leiberg*, July, 1893; Arbutus Point, *Henderson*, July, 1892; upper Valley Nisqually, *Allen* 204; Port Ludlow, *Binns*, September 5, 1890; Columbia River, latitude 46° to 49°, *Lyall* in 1860; Kittitas County, *Sandberg & Leiberg* 699; Blue Mountains, *Piper*, August, 1896; without locality, *Vasey* 57; Olympic Mountains, *Elmer* 2486.

ZONAL DISTRIBUTION: Transition and Canadian.

The western yew is by no means an abundant tree, occurring only scattered through rich, moist woods. It is, perhaps, most plentiful on the Olympic peninsula. The largest individuals reach a height of perhaps 12 meters and a diameter of 75 cm. In Hooker's Flora this species was referred to the European *Taxus baccata* L., to which it is closely allied.

PINACEAE. PINE FAMILY.

Scales of the fruit few, opposite; leaf-buds naked.
  Fruit fleshy and berry-like .... JUNIPERUS (p. 90).
  Fruit a dry cone.
    Scales of the cone shield-shaped...................... CHAMAECYPARIS (p. 91).
    Scales of the cone oblong, not peltate................ THUJA (p. 91).

Scales of the fruit numerous, alternate; leaf-buds scaly.
Leaves in clusters.
Clusters ensheathed at base, containing 2, 3, or 5 leaves... PINUS (p. 91).
Clusters not ensheathed at base, containing many leaves. LARIX (p. 92).
Leaves solitary.
Cones erect; scales deciduous .... ABIES (p. 93).
Cones pendent; scales persistent.
Branchlets smooth; bracts 3-toothed............... PSEUDOTSUGA (p. 94).
Branchlets roughened by the persistent leaf-bases.
Leaves petioled, not pungent .... TSUGA (p. 94).
Leaves sessile, pungent-pointed .... PICEA (p. 95).

JUNIPERUS.

Prostrate alpine shrub; leaves all subulate....................... 1. *J. communis.*
Erect shrubs or trees; leaves of two forms.
Leaves very resinous, dark green............................ 2. *J. occidentalis.*
Leaves not resinous, often glaucous......................... 3. *J. scopulorum.*

1. **Juniperus communis sibirica** (Burgsd.) Rydberg, Contr. Nat. Herb. 3: 533. 1896.

Juniperus sibirica Burgsd. Anleit. Holz. no. 272. 1787.

Juniperus communis alpina Wahl. Fl. Lapp. 276. 1812.

Juniperus communis montana Ait. Hort. Kew 3: 414. 1788.

TYPE LOCALITY: Siberia.

RANGE: Arctic regions, south in the mountains to California, Colorado, and Maine.

SPECIMENS EXAMINED: Olympic Mountains, *Elmer* 2487; Stevens Pass, *Sandberg & Leiberg* 768; Mount Rainier, *Piper* 2099; Loomis, *Elmer* 600; Mount Adams, *Henderson*, August, 1892.

ZONAL DISTRIBUTION: Arctic or rarely lower.

Common in the mountains at from 900 to 2,100 meters elevation. Hooker refers Tolmie's Mount Rainier specimens to *J. communis* L., but they belong to the above subspecies.

2. **Juniperus occidentalis** Hook. Fl. Bor. Am. 2: 166. 1839. WESTERN JUNIPER.

TYPE LOCALITY: "Common on the higher parts of the Columbia, at the base of the Rocky Mountains, where it attains a height of 60–80 feet, and a diameter of 2–3 feet." Collected by Douglas.

RANGE: Washington to Nevada and California.

SPECIMENS EXAMINED: Near Eltopia, *Cotton* 1022 in 1903.

ZONAL DISTRIBUTION: Arid Transition.

This is the only known station for the western juniper north of Oregon. The exact place is locally known as Ryegrass Coulee or Juniper Canyon, some 30 miles southwest of Kahlotus and near Fishhook Ferry on Snake River. The junipers occur in scattering groves on the floor of the coulee, the largest groves being about 100 acres in extent. None of the trees are over 7 meters high.

3. **Juniperus scopulorum** Sargent, Gard. & For. 10: 420. 1897.
ROCKY MOUNTAIN JUNIPER.

TYPE LOCALITY: Wyoming, Montana, and Colorado.

RANGE: Vancouver Island eastward to Montana and south in the Rocky Mountains to Arizona; also in the Black Hills.

SPECIMENS EXAMINED: Orcas Island, *Henderson*, July, 1892; Sucia Island, *Randolph*, October, 1892; Wenache, *Whited* 1001; *Sandberg & Leiberg*, July, 1893; near Lake Chelan, *Lake & Hull* 631; Spokane, *Henderson*, July, 1892; *Piper*, September, 1896; Peshastin, *Sandberg & Leiberg* 471; without locality, *Vasey* 58, Olympic Mountains, *Elmer* 2488; Ione, *Kreager* 407; Fidalgo Island, *Flett* 2116; Sentinel Bluffs, *Cotton* 1359; Everett, *Piper*.

Zonal distribution: Mostly Arid Transition, but also Upper Sonoran. It also reappears in the Humid Transition in northwest Washington.

There is some doubt as to whether the form found in western Washington is identical with that of the interior. Better and more copious material is needed to determine the point definitely.

CHAMAECYPARIS.

1. **Chamaecyparis nootkatensis** (Lamb.) Spach, Hist. Veg. **11**: 333. 1842.
Alaska cedar. Yellow cedar.

Cupressus nootkatensis Lambert, Gen. Pinus **2**: 18. 1824.

Chamaecyparis nutkaensis Spach, Hist. Veg. **11**: 333. 1842.

Type locality: Nootka Sound.

Range: Alaska south to Mount Jefferson, Oregon, mainly in the Cascade and Coast Mountains; perhaps in north Idaho.

Specimens examined: Olympic Mountains, *Piper* in 1890; *Henderson* 2047; *Elmer* 2481; Horseshoe Basin, *Elmer* 854; Skagit Pass, *Lake & Hull* 632; Cascade Mountains, latitude 49°, *Lyall* in 1859; Stevens Pass, *Sandberg & Leiberg* 796; Mount Rainier, *Piper* 2103; *Allen* 207; Goat Mountains, *Allen* 207*a*.

Zonal distribution: Hudsonian.

THUJA.

1. **Thuja plicata** Donn, Hort. Cantab. ed. 6. 249. 1811. Giant cedar.

Thuja gigantea Nutt. Journ. Phila. Acad. 7: 52. 1834.

Type locality: Nootka Sound. Collected by Menzies.

Range: Southern Alaska to northern California, eastward to Montana, and south to the Salmon River, Idaho.

Specimens examined: Seattle, *Piper* 599; Olympia, *Henderson*, April, 1892; Port Ludlow, *Binns*, September 9, 1890; Nisqually Valley, *Allen* 304; Falcon Valley, *Suksdorf* 495; Skagit Pass, *Lake & Hull* 637; Peshastin, *Sandberg & Leiberg* 483; Colville, *Lyall* in 1860; without locality, *Vasey* 63; Olympic Mountains, *Elmer* 2484; Stehekin, *Whited* 1407.

Zonal distribution: Humid Transition mainly.

For illustration of a giant cedar forest see frontispiece.

PINUS.

Leaves 5 in each fascicle; scales of the cones unarmed.
    Cones oblong-cylindric, 10 to 30 cm. long.......................... 1. *P. monticola.*
    Cones ovate or globose, 4 to 8 cm. long.......................... 2. *P. albicaulis.*
Leaves less than 5 in each fascicle; scales of the cones armed.
    Fascicles containing 3 leaves; cones large.......................... 3. *P. ponderosa.*
    Fascicles containing 2 leaves; cones small.......................... 4. *P. contorta.*

1. **Pinus monticola** Dougl. in Lambert, Desc. Gen. Pinus ed. 2. **3**: 27. *t.* 87. 1837.
Western white pine.

Type locality: Not ascertained.

Range: Southern British Columbia, south to central California, eastward to western Montana.

Specimens examined: Olympic Mountains, *Piper*, August, 1895; *Elmer* 2485; Port Ludlow, *Binns;* Cascade Mountains, latitude 49°, *Lyall* in 1860; Horseshoe Basin, Okanogan County, *Elmer* 862; Skagit Pass, *Lake & Hull*, August 24, 1892; Nisqually Valley, *Allen* 315; without locality, *Vasey* 51.

Zonal distribution: Mainly Canadian.

In Hooker's Flora our species was mistaken for its eastern relative *P. strobus.*

2. **Pinus albicaulis** Engelm. Trans. Acad. St. Louis **2**: 209. 1868. White-bark pine.

Pinus cembroides Zucc. err. det. Newberry, Pac. R. R. Rep. **6**: 44. 1857.

Type locality: Cascade Mountains, Oregon, about latitude 44°. Collected by Newberry.

Range: British Columbia, south in the Cascades and Sierras to San Bernardino County, California, eastward to western Montana and to the Blue Mountains.

Specimens examined: Mount Rainier, *Piper* 2095; *Smith* 1089; Mount Adams, *Henderson*, August 9, 1892.

Zonal distribution: Hudsonian.

In Lyall's report this pine is erroneously referred to as *P. flexilis* James.

3. **Pinus ponderosa** Dougl.; Lawson, Man. Agr. *354*. 1836. Yellow pine. Bull pine.

Type locality: Washington, on the Spokane River. Collected by Douglas.

Range: British Columbia to South Dakota, southward to Texas and New Mexico.

Specimens examined: Wenache Mountains, *Whited* 1351, 1356; Steamboat Rock, Grand Coulee, *McKay* 19.

Zonal distribution: Arid Transition, but occasional in the Upper Sonoran.

This is the common forest tree of eastern Washington. West of the Cascade Mountains it occurs locally on the gravelly prairies, as near Hillhurst. For illustrations of yellow-pine forests see Plates XIV and XV, facing pages 49 and 50.

4. **Pinus contorta** Dougl.; Loudon, Arb. Frut. 4: 2292. *f. 2210, 2211*. 1838.
Shore pine. Lodgepole pine.

Pinus murrayana Balf. in Murray, Rep. Bot. Exp. Oregon *t. 3. f. 2*. 1853.

Pinus contorta hendersoni Lemmon, Erythea 2: 176. 1894.

Pinus tenuis Lemmon, Erythea 6: 77. 1898.

Type locality: "In North-West America, in swampy ground near the sea coast; and abundantly near Cape Disappointment and Cape Lookout." Collected by Douglas.

Range: Alaska to California and Idaho.

Specimens examined: Westport, *Heller* 3946; Mount Rainier, *Allen* 308; Mount Adams, *Suksdorf*, September 28, 1896; Wenache Mountains, *Elmer* 474; *Whited* 1356; McAllisters Lake, *Henderson*, June 22, 1895; Falcon Valley, *Suksdorf*, September 29, 1896, and 1259; Pend Oreille River, *Lyall* in 1861; without locality, *Vasey* in 1889; Blue Mountains, *Piper*, July 31, 1896.

Zonal distribution: Transitional to Canadian.

This pine is very variable and by some botanists considered to consist of two species. The typical *P. contorta* of Douglas is the scrubby tree so common along the ocean coast near the shore. Away from the coast it occurs either in sterile gravelly soil or in sphagnum bogs. It is usually a small tree, but occasional examples are met 90 cm. in diameter and 30 meters or more high. East of the Cascade Mountains it forms the "lodgepole pine," *Pinus murrayana* of some botanists. This ordinarily forms dense forests, often of considerable area, in nearly pure growth, the trees being very uniform in size, 20 or 25 cm. in diameter and 18 to 22 meters high. But occasional specimens are found 90 cm. in diameter and 45 meters high.

If there are any characters by which *contorta* and *murrayana* may be distinguished botanically, they remain to be pointed out. None of the slight differences heretofore relied upon are at all constant.

Some of the earlier botanical writers referred to our tree erroneously as *Pinus inops* Sol. or *Pinus banksiana* Lamb.

LARIX.

Alpine tree; branchlets and bud scales woolly .... 1. *L. lyallii*.
Subalpine tree; branchlets and bud scales glabrous.................... 2. *L. occidentalis*.

1. **Larix lyallii** Parl. Enum. Sem. Hort. Reg. Mus. Flor. 259. 1863. Woolly larch.

Type locality: "Cascade Mountains et Galton Ranges Rocky Mountains, latitudinis 49° ad 2100 et 2300 m." Collected by Lyall.

Range: Mountains of British Columbia, south to Mount Hood, Oregon, and to the Lolo Pass, Idaho.

SPECIMENS EXAMINED: Mount Stuart, *Brandegee*, July, 1883; Cascade Mountains, latitude 49°, *Lyall* in 1860; North Fork Bridge Creek, *Elmer*, September, 1897; Wenache Mountains, *Whited* 1352.

ZONAL DISTRIBUTION: Hudsonian.

One of our rarest conifers, most plentiful on the Wenache Mountains and northward.

2. **Larix occidentalis** Nutt. Sylva 3: 143. *t. 120.* 1849. WESTERN LARCH.

TYPE LOCALITY: "In the coves of the Rocky Mountains on the western slope toward the Oregon." Collected by Nuttall.

RANGE: Cascade Mountains of British Columbia and Washington eastward to Montana and south to the Blue Mountains.

SPECIMENS EXAMINED: Upper Naches River, *Henderson*, June 10, 1892; Mount Adams, *Suksdorf* 212; Columbia River, latitude 46° to 49°, *Lyall* in 1860; Blue Mountains, *Piper*, August 2, 1896; Kamiak Butte, *Elmer* 812.

ZONAL DISTRIBUTION: Mainly Canadian.

ABIES.

Cones with conspicuous reflexed bracts.................................. 1. *A. nobilis.*
Cones with the bracts concealed.
  Leaves notched at apex, usually spreading horizontally on the branches; cones green.. 4. *A. grandis.*
  Leaves not notched at apex, mostly acute, not horizontally spreading; cones purple.
    Alpine tree; cones puberulent, 5 to 7 cm. long................. 2. *A. lasiocarpa.*
    Subalpine tree; cones not puberulent, 7 to 10 cm. long......... 3. *A. amabilis.*

1. **Abies nobilis** Lindl. Penn. Cycl. 1: 30. 1833. NOBLE FIR.

TYPE LOCALITY: Collected by Douglas on high mountains, Oregon, near the Cascades of the Columbia.

RANGE: Cascade Mountains of Washington and Oregon; Olympic Mountains.

SPECIMENS EXAMINED: Mount Rainier, *Allen* 314; *Piper* in 1889; Mount Baker, *Johnson;* Soleduck River, Olympic Mountains, *Sargent.*

ZONAL DISTRIBUTION: Canadian or Hudsonian.

2. **Abies lasiocarpa** (Hook.) Nutt. Sylva 3: 138. 1849 ALPINE FIR.

Pinus lasiocarpa Hook. Fl. Bor. Am. 2: 163. 1842.

Abies subalpina Engelm. Am. Nat. 10: 555. 1876.

TYPE LOCALITY: "Interior of N. W. America." Collected by Douglas.

RANGE: Alaska southward in the mountains to Oregon and Colorado.

SPECIMENS EXAMINED: Olympic Mountains, *Piper* in 1890; Cascade Mountains, latitude 49°, *Lyall* in 1860; Goat Mountains, *Allen* 312; Blue Mountains, *Piper*, July 31, 1896; Mount Rainier, *Piper* 2101.

ZONAL DISTRIBUTION: Arctic.

The Olympic Mountains form of this species often has exserted bracts to the cones. The form on the Blue Mountains has much larger cones than that occurring on Mount Rainier. For illustrations of this species see Plate XVII, facing page 60.

3. **Abies amabilis** (Dougl.) Forbes, Pinetum Wob. 125, *t. 44.* 1839. AMABILIS FIR.

Picea amabilis Dougl.; Loudon, Arb. Frut. 4: 2342. 1838.

TYPE LOCALITY: Collected by Douglas on high mountains, Oregon, near the Cascades of the Columbia.

RANGE: British Columbia, south in the Cascade Mountains of Washington and Oregon; also in the Olympic Mountains.

SPECIMENS EXAMINED: Olympic Mountains, *Piper* in 1895; Mount Rainier, *Allen* 313; *Piper* in 1888.

Zonal distribution: Canadian.

Mr. Suksdorf informs me that the *Abies magnifica* Murr.? of his list is probably only *A. amabilis*.

4. **Abies grandis** Lindl. Penn. Cycl. 1: 30. 1833. White fir.

Type locality: Not ascertained.

Range: British Columbia south to northern California, eastward to Montana and the Blue Mountains, Oregon.

Specimens examined: East Sound, *Henderson*, July 3, 1892; Port Ludlow, *Binns*, September 3, 1890; Tacoma, *Flett*, April 20, 1897; upper Nisqually Valley, *Allen* 311; Skagit Pass, *Lake & Hull*, August, 1892; Cascade Mountains, *Lyall*, July, 1860; Blue Mountains, *Piper*, July, 1897.

Zonal distribution: Transition and Canadian.

The tree recorded from near Mount Rainier by Plummer as *Abies concolor* (Gord.) Parry is probably an erroneous identification of a form of *A. grandis*.

PSEUDOTSUGA.

1. **Pseudotsuga mucronata** (Raf.) Sudw. Contr. Nat. Herb. 3: 266. 1895.
Red fir. Douglas spruce.

Abies mucronata Raf. Atl. Journ. 120. 1832.
Abies douglasii Lindl. Penn. Cycl. 1: 32. 1833.
Pseudotsuga douglasii Carr. Trait. Conif. nouv. éd. 256. 1867.
Pseudotsuga taxifolia Britton, Trans. N. Y. Acad. Sci. 8: 74. 1889.

Type locality: Mouth of the Columbia River, Oregon.

Range: Alaska and British America, latitude 55°, south to southern California, Arizona, and western Texas.

Specimens examined: Olympic Mountains, *Elmer* 2480; Nisqually Valley, *Allen* 209; head of Grand Coulee, *McKay* 23; Kamiak Butte, *Elmer* 811.

Zonal distribution: Mainly Humid Transition.

The commonest tree of the State, making up the bulk of the forest west of the Cascade Mountains and common in eastern Washington in the upper part of the yellow pine zone. For illustration of a red fir forest see Plate VII, facing page 36.

TSUGA.

Lowland tree; cones 1 to 2 cm. long	1. *T. heterophylla*.
Alpine tree; cones 5 to 7 cm. long	2. *T. mertensiana*.

1. **Tsuga heterophylla** (Raf.) Sarg. Silva N. A. 12: 73. 1898. Western hemlock.

Abies heterophylla Raf. Atl. Journ. 119. 1832.

Type locality: Mouth of the Columbia River, Oregon.

Range: Alaska to northern California and western Montana.

Specimens examined: Olympic Mountains, *Elmer* 2482; Cascade Mountains, latitude 49°, *Lyall*; Horseshoe Basin, *Elmer* 710; Seattle, *Piper*, September, 1896; Chambers Lake, *Henderson*, August 23, 1892; Port Ludlow, *Binns*, September, 1890; Nisqually Valley, *Allen* 305; Yakima Pass, *Watson* 384; Lake Keechelus, *Henderson*, July 26, 1892.

Zonal distribution: Humid Transition and Canadian.

In Cooper's report and other early botanical works this hemlock was referred to the eastern *T. canadensis*. For illustration of a hemlock forest see Plate XVI, facing page 58.

2. **Tsuga mertensiana** (Bong.) Carr. Trait. Conif. nouv. éd. 250. 1867.
Black hemlock.

Pinus mertensiana Bong. Mem. Acad. St. Petersb. VI. 2: 45. 1832.
Abies pattoniana Jeffrey, Rep. Bot. Exp. Oregon. 1853.
Tsuga pattoniana Engelm. in Wats. Bot. Cal. 2: 121. 1880.
Tsuga hookeriana Carr. Trait. Conif. nouv. éd. 252. 1867.

Type locality: Sitka.

Range: Alaska to California and Montana.

Specimens examined: Olympic Mountains, *Henderson*, August 9, 1892; *Elmer* 2483; Mount Rainier, *Piper*, August, 1895; *Allen* 306; Mount Adams, *Henderson*, August 9, 1892; Skagit Pass, *Lake & Hull*, August 24, 1892; Bridge Creek, *Elmer* 871, September, 1897.

Zonal distribution: Hudsonian.

PICEA.

Leaves flattened; sea-coast tree .... 1. *P. sitchensis.*
Leaves quadrangular; subalpine tree .... 2. *P. engelmanni.*

1. Picea sitchensis (Bong.) Traut. & Meyer, Fl. Ochot. 87. 1856. Sitka spruce.

Pinus sitchensis Bong. Mem. Acad. St. Petersb. VI. 2: 164. 1832.

Abies menziesii Lindl. Penn. Cycl. 1: 32. 1833.

Type locality: Sitka.

Range: Along the coast from Alaska to northern California.

Specimens examined: Olympic Mountains, *Elmer* 2489; Hoquiam, *Lamb* 1075; Seattle, *Piper* in 1885.

Zonal distribution: Humid Transition.

A very abundant tree along the ocean coast, but only locally plentiful on Puget Sound.

2. Picea engelmanni Parry in Engelm. Trans. St. Louis Acad. 2: 212. 1863. Engelmann spruce.

Picea columbiana Lemmon, Gard. & For. 10: 183. 1897.

Type locality: "Higher parts of the Rocky Mountains, from New Mexico to the headwaters of the Columbia and Missouri rivers."

Range: British Columbia, southward to Arizona in the Rocky Mountains, and in the Cascade Mountains of Washington.

Specimens examined: Wenache, *Elmer* 473; Blue Mountains, *Piper*, July 31, 1896; east side Cascade Mountains, *Lyall;* without locality, *Vasey* 64.

Zonal distribution: Mainly Canadian.

The Klickitat County specimens considered by Suksdorf to represent *Picea pungens* Engelm. and so listed seem rather to be *P. engelmanni.*

TYPHACEAE.

TYPHA.

1. Typha latifolia. L. Sp. Pl. 2: 971. 1753. Cattail.

Type locality: "Habitat in paludibus Europae."

Range: Throughout the northern hemisphere except the Arctic regions.

Specimens examined: Samish Lake, *Suksdorf* 1007; Rock Lake, *Lake & Hull* 627; Pullman, *Piper*, July 15, 1901; Cow Creek, *Griffiths & Cotton* 532; Stehekin, *Griffiths & Cotton* 226; Prosser, *Cotton* 740.

Zonal distribution: Upper Sonoran and Transition.

The cattail is exceedingly common about lakes and marshes in western Washington and scarcely less so in eastern Washington. Botanical specimens of it are, however, seldom gathered.

SPARGANIACEAE.

SPARGANIUM. Bur reed.

Inflorescence branching.
  Fruits stalked .... 1. *S. eurycarpum.*
  Fruits sessile .... 2. *S. androcladum.*

- Inflorescence simple.
  - Stems erect .... 3. *S. simplex.*
  - Stems floating.
    - Nutlets fusiform, dark, 4 mm. long .... 4. *S. angustifolium.*
    - Nutlets oblong, obovate, 2 to 3 mm. long .... 5. *S. minimum.*

1. **Sparganium eurycarpum** Engelm. in A. Gray, Man. ed. 2. 430. 1856.

Type locality: "Borders of ponds, etc., common northward and especially westward."

Range: British Columbia to Newfoundland, south to California, Utah, and Virginia.

Specimens examined: Kalispel Lake, *Kreager* 488, a doubtful specimen.

Zonal distribution: Transition.

2. **Sparganium androcladum** (Engelm.) Morong, Bull. Torr. Club **15**: 78. 1888.

Sparganium simplex androcladum Engelm. in A. Gray, Man. ed. 5. 481. 1867.

Type locality: "From New England southward and especially westward."

Range: British Columbia to Nova Scotia, south to Texas and Florida.

Specimens examined: Near Montesano, *Heller* 3865; Seattle, *Piper* 713; Tacoma, *Flett* 151; Puyallup, *Piper*, September 2, 1899; Rock Lake, *Lake & Hull* 630; Touchet River, *Horner* 20.

Zonal distribution: Transition.

This species was referred to in Cooper's Report as *S. ramosum* Smith.

3. **Sparganium simplex** Huds. Fl. Angl. ed. 2. 401. 1778.

Type locality: "Circa Norwich," England.

Range: British Columbia to Labrador, south to California and Pennsylvania.

Specimens examined: Cascade Mountains, 49°, *Lyall* in 1859; Seattle, *Smith* 712; Peshastin, *Sandberg & Leiberg* 600; Lake Keechelus, *Henderson*, July, 1892; without locality, *Vasey* in 1889.

Zonal distribution: Transition.

4. **Sparganium angustifolium** Michx. Fl. **2**: 189. 1803.

Sparganium simplex angustifolium Engelm. in A. Gray, Man. ed. 5. 481. 1867.

Type locality: "Hab. in amnibus Canadae."

Range: British Columbia to California, east to Ontario and New York.

Specimens examined: Without locality, *Vasey* in 1889.

Zonal distribution: Transition.

5. **Sparganium minimum** Fries, Sum. Veg. **2**: 560. 1846.

Type locality: Scandinavian.

Range: British Columbia to New Brunswick, south to Oregon, Utah, and Pennsylvania. Europe.

Specimens examined: Mount Rainier, *Smith* in 1889; Mount Adams, *Henderson*, August, 1882; Falcon Valley, *Suksdorf* 518; Spokane Falls, *Watson* 399; without locality, *Vasey* in 1889.

Zonal distribution: Transition to Hudsonian.

POTAMOGETONACEAE.

POTAMOGETON. Pondweed.

- Floating leaves broad; stipules free.
  - Submerged leaves grass-like.
    - Stipules long; floating leaves subcordate at base............ 1. ***P. natans.***
    - Stipules short; floating leaves attenuate at base............ 2. ***P. nuttallii.***
  - Submerged leaves lanceolate.
    - Floating leaves 30 to 50-nerved.......................... 3. ***P. amplifolius.***
    - Floating leaves 10 to 20-nerved.
      - Petioles of floating leaves short........................ 4. ***P. alpinus.***
      - Petioles of floating leaves long.
        - Stipules obtuse................................ 5. ***P. heterophyllus.***
        - Stipules acuminate.............................. 6. ***P. lonchites.***

- Floating leaves none.
  - Leaves all oblong or lanceolate.
    - Base of leaves clasping; apex acuminate.................. 7. *P. perfoliatus.*
    - Base of leaves not clasping; apex not acuminate.
      - Leaves obtuse, cucullate, sessile...................... 8. *P. praelongus.*
      - Leaves acute, short-petioled........................... 9. *P. lucens.*
  - Leaves all narrowly linear.
    - Stipules adnate to the sheathing base of the leaf.
      - Leaves setaceous, 1 to 5-nerved...................... 13. *P. pectinatus.*
      - Leaves linear-lanceolate, many-nerved................. 14. *P. robbinsii.*
    - Stipules free.
      - Leaves tape-like; spike cylindric; fruit large.......... 10. *P. zosteraefolius.*
      - Leaves not tape-like; spike not cylindric; fruit small.
        - Spike capitate; peduncles very short............ 11. *P. californicus.*
        - Spike interrupted; peduncles long................ 12. *P. pusillus.*

1. **Potamogeton natans** L. Sp. Pl. **1**: 126. 1753.

TYPE LOCALITY: European.

RANGE: North America. Europe. Asia.

SPECIMENS EXAMINED: Cascade Mountains, 49°, *Lyall* in 1859; Oyhut, *Lamb* 1259; Tacoma, *Flett* 135; Falcon Valley, *Suksdorf*, July 17, 1886; Pend Oreille River, *Lyall* in 1861.

2. **Potamogeton nuttallii** Cham. & Schlecht. Linnaea **2**: 226. *t. 6. f. 25.* 1827.

Potamogeton claytonii Tuck. Am. Journ. Sci. **14**: 38. 1843.

TYPE LOCALITY: None given.

RANGE: Washington and Oregon to Nova Scotia and South Carolina.

SPECIMENS EXAMINED: Montesano, *Heller* 4072; Ilwaco, *Henderson* in 1886; Lake Washington, *Piper*, September, 1892; Mount Constitution, *Henderson* 2477; Spokane County, *Henderson* 2476; Waitsburg, *Horner* R16.

3. **Potamogeton amplifolius** Tuck. Am. Journ. Sci. II. **6**: 225. 1848.

TYPE LOCALITY: Cambridge, Massachusetts.

RANGE: British Columbia to Ontario, south to Washington and Nebraska.

SPECIMENS EXAMINED: Coupeville, *Gardner* 421; Pullman, *Henderson* 2474; Kalispel Lake, *Kreager* 441; Whatcom County, *Suksdorf*, August 1, 1890.

4. **Potamogeton alpinus** Balbis, Mem. Acad. Turin **7**: 323. 1803.

Potamogeton rufescens Schrad.; Cham. Ad. Fl. Ber. 5. 1815.

TYPE LOCALITY: European.

RANGE: British Columbia to Labrador, south to California and New Jersey.

SPECIMENS EXAMINED: Mount Adams, *Suksdorf*, September, 1879; Trout Creek, *Suksdorf* 2172.

5. **Potamogeton heterophyllus** Schreb. Spicileg. Fl. Lips. 21. 1771.

TYPE LOCALITY: "In stagno ad Lindenthal," Germany.

RANGE: Throughout most of North America. Europe.

SPECIMENS EXAMINED: Lake Chelan, *Lake & Hull* 614; Okanogan River, *Watson* 396; Tumwater Canyon, *Sandberg & Leiberg* 524; Falcon Valley, *Suksdorf*, August, 1885.

6. **Potamogeton lonchites** Tuck. Am. Journ. Sci. II. **6**: 226. 1848.

TYPE LOCALITY: "Common in New England and extending southward to Virginia."

RANGE: Washington to New Brunswick, south to California and Florida.

SPECIMENS EXAMINED: Clallam County, *Elmer* 2798; Silver Lake, *Henderson* 2475; Okanogan River, *Watson* 398; Pend Oreille River, *Lyall* in 1861; Whitman County, *Henderson* 2473; Union Flat, *Piper*, August 4, 1899, without locality, *Vasey* in 1889.

7. **Potamogeton perfoliatus richardsonii** Bennett, Journ. Bot. **27**: 25. 1889.

Potamogeton perfoliatus lanceolatus Robbins in Gray, Man. ed. 5. 488. 1867, not *P. lanceolatus* Smith, 1824–28.

Type locality: "Along the Great Lakes."

Range: British Columbia to New England, south to California and Nebraska.

Specimens examined: Lake Washington, *Piper*, August, 1892; Whatcom River, *Gardner* 419; Lake Chelan, *Dr. T. E. Wilcox* in 1883; Fort Colville, Rocky Mountains, *Lyall* in 1861; Lake Chelan, *Gorman* 677; Prosser, *Griffiths & Cotton* 809.

The specimen upon which the "*P. crispus* L. ?" of Suksdorf's list is based proves to be a sterile specimen of the above from Lake Washington.

8. **Potamogeton praelongus** Wulf. Roem. Arch. III. **3**: 331. 1803.

Type locality: "Laboci Junio Julique in fluvio cognomine, et in fluvio Jschiza."

Range: British Columbia to Nova Scotia, south to California and Pennsylvania. Europe. Asia.

Specimens examined: Tacoma, *Flett* 2160.

9. **Potamogeton lucens** L. Sp. Pl. **1**: 126. 1753.

Type locality: "Hab. in Europae lacubus, stagnis, fluviis argillosis."

Range: British Columbia to Nova Scotia, south to California and New Jersey. Europe. Asia.

Specimens examined: Lake Chelan, *Gorman* 703.

10. **Potamogeton zosteraefolius** Schum. Enum. Pl. Saell. 50. 1801.

Type locality: Saellandia.

Range: Oregon and British Columbia to New Jersey and New Brunswick. Europe.

Specimens examined: Whatcom County, *Suksdorf*, August 1, 1890.

11. **Potamogeton californicus** (Morong).

Potamogeton pauciflorus californicus Morong, Bot. Gaz. **10**: 254. 1885.

Type locality: San Diego County, California.

Range: Washington to California.

Specimens examined: Pullman, *Piper* 1802.

12. **Potamogeton pusillus** L. Sp. Pl. **1**: 127. 1753.

Type locality: Europe.

Range: British Columbia to New Brunswick, south to California, Texas, and Virginia. Europe.

Specimens examined: Seattle, *Piper* 761; Okanogan River, *Watson* 395.

13. **Potamogeton pectinatus** L. Sp. Pl. **1**: 127. 1753.

Potamogeton columbianus Suksdorf, Deutsch. Bot. Monatss. **19**: 92. 1901.

Type locality: European.

Range: British Columbia to New Brunswick, south to California and Florida. Europe.

Specimens examined: Cascade Mountains, 49°, *Lyall* in 1859; west Klickitat County, *Suksdorf* 2062: White Salmon, *Suksdorf* 221; Okanogan River, *Watson* 394.

14. **Potamogeton robbinsii** Oakes, Hovey's Mag. **7**: 180. 1841.

Type locality: "In Pondicherry Pond, Jefferson, N. H."

Range: Washington to New Brunswick, south to Oregon and Pennsylvania.

Specimens examined: Lake Cushman, *Piper* 2231; *Henderson* 1861; Lake Chelan *Gorman* in 1898.

Potamogeton pulcher Tuck. is listed by Suksdorf. The basis is a sterile plant from Glenwood, which may belong to *P. amplifolius* Tuck.

Potamogeton marinus L. is included in Suksdorf's list based on a sterile plant from Bingen, which seems to be *P. pectinatus* L.

NAIADACEAE.

Carpels several to each flower.
Flowers perfect, peduncled; leaves opposite .... RUPPIA.
Flowers monoecious; leaves alternate .... ZANNICHELLIA.
Carpels solitary; flowers monoecious or dioecious.
Leaves opposite or whorled, denticulate .... NAIAS.
Leaves alternate, entire, long-linear.
Monoecious; ovaries pendulous .... ZOSTERA.
Dioecious; ovaries ascending .... PHYLLOSPADIX.

RUPPIA.

Sheaths 6 to 8 mm. long; fruit 2 mm. long .... 1. *R. maritima.*
Sheaths 12 to 30 mm. long; fruit 3 to 4 mm. long .... 2. *R. occidentalis.*

1. **Ruppia maritima** L. Sp. Pl. 1: 127. 1753.
Type locality: European.
Range: In brackish water, nearly cosmopolitan.
Specimens examined: Clallam County, *Elmer* 2797; Whidby Island, *Gardner* 348; Anacortes, *Henderson,* July, 1892; Ocosta, *Henderson*, June, 1892; Seattle, *Piper* 2863.

2. **Ruppia occidentalis** S. Wats. Proc. Am. Acad. **25**: 138. 1890.
Type locality: "In saline ponds near Kamloops, British Columbia." Collected by Macoun.
Range: British Columbia to Washington and Nebraska.
Specimens examined: Lake Chelan, *Lake & Hull.*

ZANNICHELLIA.

1. **Zannichellia palustris** L. Sp. Pl. **2**: 969. 1753.
Type locality: "Habitat in Europae, Virginiae fossis, fluviis."
Range: Throughout most of North America. Europe. Asia.
Specimens examined: West Klickitat County, *Suksdorf* 2174; Junction Crab and Wilson Creeks, *Sandberg & Leiberg* 264; Marshall Junction, *Piper*, July 2, 1896.

NAIAS.

1. **Naias flexilis** (Willd.) Rostk. & Schmidt, Fl. Sed. 384. 1824.
Caulinia flexilis Willd. Abh. Akad. Berlin 95. 1803.
Type locality: European.
Range: Throughout most of North America. Europe.
Specimens examined: Green Lake, *Piper*; Lake Chelan, *Elmer*, September, 1897.

ZOSTERA.

1. **Zostera marina** L. Sp. Pl. **2**: 968. 1753. Eelgrass.
Zostera oregana Wats. Proc. Am. Acad. **26**: 131. 1891.
Type locality: "Habitat in mari Balthico, Oceano."
Range: Seacoasts, Alaska to California and Greenland to Florida. Europe. Asia.
Specimens examined: Grays Harbor, *Henderson* 2471; Orchard Point, *Piper* 2314.

Eelgrass is very abundant at about low-tide mark all along the seashore, especially in quiet water. Fruiting specimens are very rarely found. Better material for study is much to be desired.

PHYLLOSPADIX.

1. **Phyllospadix scouleri** Hook. Fl. Bor. Am. **2**: 171. 1839.

Type locality: "Dundas Island in the Columbia River," *Dr. Scouler*.

Range: Seacoast, British Columbia to California.

Specimens examined: Whidby Island, *Gardner* 323.

The other species, *P. torreyi* Wats., may be expected to occur on the Washington coast, as it is known from California and from Vancouver Island.

SCHEUCHZERIACEAE.

Leaves basal; flowers in a long spike-like raceme .... Triglochin.
Stems leafy; flowers few in a loose raceme .... Scheuchzeria.

TRIGLOCHIN.

Carpels 3; fruit linear or clavate .... 1. *T. palustris*.
Carpels 6; fruit oblong or ovoid .... 2. *T. maritima*.

1. **Triglochin palustris** L. Sp. Pl. **1**: 338. 1753.

Type locality: European.

Range: Alaska to New Brunswick, south to Washington and New York.

Specimens examined: Colville, *Kreager* 52C.

Zonal distribution: Arid Transition.

2. **Triglochin maritima** L. Sp. Pl. **1**: 339. 1753.

Type locality: Europe.

Range: Alaska to Labrador, south to California and New Jersey.

Specimens examined: Clallam County, *Elmer* 2571; Whidby Island, *Gardner* 355; Admiralty Head, *Piper*; Orchard Point, *Piper*, July, 1895; Seattle, *Piper* 680; Lopez Island, *Lyall* in 1858–59; Falcon Valley, *Suksdorf* 617; Lake Chelan, *Elmer*, September, 1897; *Lake & Hull* 628; Loomis, *Elmer* 261; Sprague, *Sandberg & Leiberg* 210; Medical Lake, *Henderson*, July 2, 1892; Priest Rapids, *Cotton* 1378.

Zonal distribution: Transition.

SCHEUCHZERIA.

1. **Scheuchzeria palustris** L. Sp. Pl. **1**: 338. 1753.

Type locality: "Habitat in Lapponiae, Helvetiae, Borussiae, Sueciae paludosis."

Range: British Columbia to Labrador, south to California and Pennsylvania.

Specimens examined: Seattle, *Piper* 693; Skamania County, *Suksdorf* 1327; White Salmon, *Suksdorf* in 1878; Colville to Rocky Mountains, *Lyall* in 1861; Tacoma, *Flett* 2226.

Zonal distribution: Humid Transition.

ALISMACEAE.

Carpels in a ring on a flat receptacle; leaves ovate .... Alisma.
Carpels in many series on a convex receptacle; leaves sagittate (in ours) .... Sagittaria.

ALISMA.

1. **Alisma plantago-aquatica** L. Sp. Pl. **1**: 342. 1753. Water plantain.

Type locality: European.

Range: Nearly throughout North America, Europe, Asia.

Specimens examined. Cascade Mountains, latitude 49°, *Lyall* in 1859; Seattle, *Piper*, August, 1892; Tacoma, *Flett* 153; west Klickitat County, *Suksdorf* 1317; Ellensburg, *Whited* 498, Wenache, *Whited* 1428; North Yakima, *Watt*, August, 1895; Columbia River, 46° to 49°, *Lyall* in 1860; Kalispel Valley, *Kreager* 363; Usk, *Kreager* 366; *Cotton* 432; Nason Creek, *Sandberg & Leiberg* 694; without locality, *Vasey* 66; Waitsburg, *Horner* 21; Pullman, *Hull* 629; *Piper*, July, 1897.

ZONAL DISTRIBUTION: Transition.

SAGITTARIA. ARROWHEAD.

Beak of the akene horizontal or oblique, more than one-fourth its length .. 1. *S. latifolia.*
Beak of the akene less than one-fourth its length.
  Bracts 8 to 20 mm. long; bog plant .... 2. *S. arifolia.*
  Bracts 4 to 6 mm. long; water plant .... 3. *S. cuneata.*

1. **Sagittaria latifolia** Willd. Sp. Pl. **4**: 409. 1805. WAPATO.

Sagittaria sagittifolia macrophylla Hook. Fl. Bor. Am. **2**: 167. 1839.
Sagittaria sagittifolia vulgaris Hook. loc. cit.
Sagittaria esculenta Howell, Fl. N. W. Am. 679. 1903.

TYPE LOCALITY: "Habitat a Canada ad Carolinam."

RANGE: Throughout most of North America.

SPECIMENS EXAMINED: Cascade Mountains, 49°, *Lyall* in 1858; Seattle, *Piper*, August, 1892; Chambers Lake, *Henderson*, August, 1892; Falcon Valley, *Suksdorf* 673.

ZONAL DISTRIBUTION: Transition.

This is the wapato or wappatoo, formerly an important food plant of the Indians. The introduction of the European carp into the Columbia River has nearly caused the extermination of this plant, where it used to be abundant.

2. **Sagittaria arifolia** Nutt.; J. G. Smith, Ann. Rep. Mo. Bot. Gard. **6**: 32. 1894.

TYPE LOCALITY: Oregon. Collected by Nuttall.

RANGE: British Columbia to Quebec, south to California and Kansas.

SPECIMENS EXAMINED: West Klickitat County, *Suksdorf* 1318; Lake Chelan, *Lake & Hull*, August, 1892; Colville, *Lyall* in 1860; Union Flat, *Piper* 3049, 3049; *Lake & Hull* 626; Pullman, *Hardwick*, July, 1895; Prosser, *Griffiths & Cotton* 806.

ZONAL DISTRIBUTION: Arid Transition.

2a. **Sagittaria arifolia stricta** J. G. Smith, Ann. Rep. Mo. Bot. Gard. **6**: 34. 1894.

TYPE LOCALITY: Falcon Valley, Klickitat County, Washington. Collected by Suksdorf.

RANGE: Washington.

SPECIMENS EXAMINED: Falcon Valley, *Suksdorf* 674.

3. **Sagittaria cuneata** Sheld. Bull. Torr. Club **20**: 283. 1893.

TYPE TOCALITY: "East Battle Lake, Otter Tail County," Minnesota.

RANGE: Washington to Minnesota, north to British Columbia and Saskatchewan.

SPECIMENS EXAMINED: Phileo Lake, Spokane County, *Suksdorf* 2262.

VALLISNERIACEAE.

ANACHARIS.

1. **Anacharis canadensis** (Michx.) Planch. Ann. Sci. Nat. III. **11**: 75. 1849.

Elodea canadensis Michx. Fl. **1**: 20. 1803. WATERWEED.
Philotria canadensis Britton, Science II. **2**: 5. 1895.

TYPE LOCALITY: "Hab. in rivulis Canadae."

RANGE: Throughout most of North America.

SPECIMENS EXAMINED: Green Lake, *Piper*, September, 1898; Lake Chelan, *Gorman* in 1897.

POACEAE. GRASS FAMILY.

KEY TO THE TRIBES.

- Spikelets, 1 or 2-flowered.
  - Rachilla articulated below the glumes, the spikelet 1 or 2-flowered, when 2-flowered the lower staminate.
    - Glumes 2; spikelets flattened.................................. ORYZEAE.
    - Glumes apparently 3 or 4; spikelets not flattened............... PANICEAE.
  - Rachilla articulated above the glumes.
    - Glumes apparently 4; palea 1-nerved .... PHALARIDEAE.
    - Glumes 2; palea 2-nerved.................................... AGROSTIDEAE.
- Spikelets 2 to many-flowered.
  - Inflorescence a panicle or raceme.
    - Lemma shorter than the glumes, usually with a bent awn arising from the back.. AVENEAE.
    - Lemma longer than the glumes, awnless or with a straight apical awn.. FESTUCEAE.
  - Inflorescence a spike.
    - Spikelets crowded in 2 rows, forming one-sided spikes........... CHLORIDEAE.
    - Spikelets in 2 opposite rows................................... HORDEAE.

KEY TO THE GENERA.

ORYZEAE.

- Flowers perfect; glumes and lemmas keeled............... **HOMALOCENCHRUS** (p. 104).

PANICEAE.

- Spikelets in one-sided racemes or spikes.
  - First glume very small.............................. **SYNTHERISMA** (p. 104).
  - First glume well developed.......................... **PASPALUM** (p. 104).
- Spikelets not in one-sided racemes or spikes.
  - Inflorescence dense; pedicels bearing bristles .... **CHAETOCHLOA** (p. 106).
  - Inflorescence loose; pedicels not bristly .... **PANICUM** (p. 105).

PHALARIDEAE.

- Spikelet with 3 florets, the uppermost perfect, the others staminate.. **SAVASTANA** (p. 106).
- Spikelet with 1 perfect floret, the lateral ones reduced to sterile lemmas.
  - Sterile lemmas bifid, awned.......................... **ANTHOXANTHUM** (p. 106).
  - Sterile lemmas awnless, very small................... **PHALARIS** (p. 106).

AGROSTIDEAE.

- Lemma with a long terminal awn, and closely embracing the grain.
  - Fruiting lemma thin and membranaceous............. **MUHLENBERGIA** (p. 110).
  - Fruiting lemma firm and indurated.
    - Awns 3-branched............................... **ARISTIDA** (p. 107).
    - Awns simple.
      - Twisted, persistent on the lemma............ **STIPA** (p. 107).
      - Straight, deciduous from the lemma.......... **ORYZOPSIS** (p. 109).

- Lemma awnless or short-awned, and loosely enveloping the grain.
  - Inflorescence a dense spike.
    - Spikelets early deciduous; lemma with a dorsal awn... ALOPECURUS (p. 110).
    - Spikelets persistent; lemma awnless or with a terminal awn.
      - Spikes ovoid; glumes long-awned................ POLYPOGON (p. 111).
      - Spikes cylindric; glumes not long-awned.......... PHLEUM (p. 111).
  - Inflorescence a loose panicle.
    - Fruit a utricle.................................... SPOROBOLUS (p. 112).
    - Fruit a grain.
      - Palet 1-nerved; stamen 1...................... CINNA (p. 113).
      - Palet 2-nerved; stamens 3.
        - Glumes none; plant, minute .... COLEANTHUS (p. 114).
        - Glumes 2.
          - Callus with a tuft of long hairs at base... CALAMAGROSTIS (p. 114).
          - Callus naked.......................... AGROSTIS (p. 118).

AVENEAE.

- Perfect flower only one, the other staminate.
  - Lower flower perfect; upper staminate and awned......... HOLCUS (p. 121).
  - Lower flower staminate, long-awned; second flower perfect, awnless .... ARRHENATHERUM (p.121).
- Perfect flowers 2 or more.
  - Rachilla not prolonged beyond the upper flower........... AIRA (p. 121).
  - Rachilla prolonged beyond the upper flower.
    - Awn of the lemma arising between the two terminal teeth .... MERATHREPTA (p. 122).
    - Awn of the lemma dorsal.
      - Florets large, more than 15 mm. long............ AVENA (p. 123).
      - Florets small, less than 15 mm. long.
        - Lemma erose-truncate..................... DESCHAMPSIA (p. 123).
        - Lemma 2-toothed .... TRISETUM (p. 124).

FESTUCEAE.

- Lemma 3-nerved, rarely 1-nerved.
  - Rachilla with long hairs.................................. PHRAGMITES (p. 125).
  - Rachilla glabrous or with short hairs.
    - Glumes obtuse, very unlike, the upper inclosing the flowers.. ESTONIA (p. 125).
    - Glumes subequal, acute.
      - Panicle close; spikelets 2 to 4-flowered .... KOELERIA (p. 126).
      - Panicle loose; spikelets usually many-flowered.... ERAGROSTIS (p. 126).
- Lemma 5-nerved or more.
  - Spikelets with the upper florets sterile and folded about each other .... MELICA (p. 127).
  - Spikelets with the upper florets perfect, or narrow and abortive.
    - Keels of the palea winged.......................... PLEUROPOGON (p. 128).
    - Keels of the palea not winged.
      - Stigmas arising below the apex of the ovary..... BROMUS (p. 141).
      - Stigmas arising at the apex of the ovary.
        - Lemmas compressed and keeled.

Lemmas awn-pointed.................. DACTYLIS (p. 128).
Lemmas pointless.
Glumes 1 to 3-nerved............. POA (p. 128).
Glumes 5-nerved or more.......... DISTICHLIS (p. 135).
Lemmas convex or rounded on the back.
Lemmas acute or awned............. FESTUCA (p. 135).
Lemmas obtuse and scarious at apex.
Prominently 5 to 7-nerved......... PANICULARIA (p. 139).
Obscurely 5-nerved............... PUCCINELLIA (p. 141).

CHLORIDEAE.

Pedicel jointed above the persisting glumes; spikes digitate..... CAPRIOLA (p. 146).
Pedicel jointed below the glumes.
Spikelets much flattened; glumes unequal, keeled......... SPARTINA (p. 145).
Spikelets subterete; glumes equal, convex................ BECKMANNIA (p. 145).

HORDEAE.

Spikelets mostly solitary at each joint of the rachis.
Spikelet 1-flowered..................................... SCRIBNERIA (p. 146).
Spikelet several-flowered.
Placed edgewise on the rachis.......................... LOLIUM (p. 146).
Placed flatwise on the rachis.......................... AGROPYRON (p. 146).
Spikelets two or more at each joint of the rachis.
Spikelets 1-flowered.................................... HORDEUM (p. 149).
Spikelets 2 to many-flowered.
Rachis continuous..................................... ELYMUS (p. 150).
Rachis readily separating into joints.................. SITANION (p. 153).

HOMALOCENCHRUS.

1. **Homalocenchrus oryzoides** (L.) Poll. Hist. Pl. Palat. 1: 52. 1776.
Leersia oryzoides Sw. Prod. Veg. Ind. Occ. 21. 1788.
Phalaris oryzoides L. Sp. Pl. 1: 55. 1753.
TYPE LOCALITY: "Habitat in Virginiae paludibus nemorosis."
RANGE: Newfoundland to Washington, south to Florida, Texas, and California.
SPECIMENS EXAMINED: Seattle, *Piper* in 1889; North Yakima, *Leckenby*, August, 1897.
ZONAL DISTRIBUTION: Transition and Upper Sonoran.

PASPALUM.

1. **Paspalum distichum** L. Amoen. Acad. 5: 391. 1759.
TYPE LOCALITY: Jamaica.
SPECIMENS EXAMINED: Along Columbia River, *Leckenby*, October, 1900; Klickitat County, *Suksdorf*.
Introduced along the banks of the lower Columbia River.

SYNTHERISMA.

1. **Syntherisma sanguinale** (L.) Nash, Bull. Torr. Club 22: 420. 1895. CRABGRASS.
Panicum sanguinale L. Sp. Pl. 1: 57. 1753.
Digitaria sanguinalis Scop. Fl. Carn. ed. 2. 1: 52. 1772.
Syntherisma praecox Walt. Fl. Car. 76. 1788.
TYPE LOCALITY: "Habitat in America, Europa australi."
SPECIMENS EXAMINED: Pullman, *Piper* 1920.
Sparingly introduced as a weed in grass seed.

PANICUM.

Spikelets in one-sided racemes, awned; summit of the palet free ..... 1. *P. crus-galli.*
Spikelets in open panicles, awnless; summit of the palet inclosed in glume.
Annual, spikelets pointed.
Culms 15 to 25 cm. high, slender; spikelets 2.5 mm. long... 2. *P. barbipulvinatum.*
Culms 40 cm. or more high, stout; spikelets 3.5 mm. long . 3. *P. hirticaulum.*
Perennial, spikelets obtuse.
Culms stout; spikelets 3 mm. long .... 4. *P. scribnerianum.*
Culms slender; spikelets 1.5 mm. long.................. 5. *P. occidentale.*

1. **Panicum crus-galli** L. Sp. Pl. **1**: 56. 1753. BARNYARD GRASS.

TYPE LOCALITY: "Habitat in Europae et Virginiae cultis."

RANGE: A native of Europe widely established as a weed.

SPECIMENS EXAMINED: Seattle, *Piper*; Alma, *Elmer* 530; North Yakima, *Watt*, August, 1895; Parker, *A. D. Dunn*, August 8, 1901; west Klickitat County, *Suksdorf* 2329; Almota, *Piper*, September, 1896; Wawawai, *Lake* 87; Davis Lake, *Kreager* 441; Marcus, *Kreager* 460.

2. **Panicum barbipulvinatum** Nash, Mem. N. Y. Bot. Gard. **1**: 21. 1900.

Panicum capillare brevifolium Vasey, U. S. Dept. Agr. Div. Agrost. Bull. **5**: 21. 1897, not *P. brevifolium* L. 1753.

TYPE LOCALITY: "Manhattan, on a shaded sand bar in the Gallatin River," Montana.

RANGE: Washington to Montana.

SPECIMENS EXAMINED: White River, *Vasey* 66; Chelan, *Elmer* 484, 848; Kittitas County, *Sandberg & Leiberg* 431; North Yakima, *Henderson* 2219; *Watt*, August, 1895; Fort Colville, *Lyall* in 1860; *Watson* 445; Whitman County, *Lake & Hull* 63; Dry Creek, Whitman County, *Vasey* 65; Yelm Prairie, *Piper* in 1888.

ZONAL DISTRIBUTION: Upper Sonoran and Transition.

3. **Panicum hirticaulum** Presl, Rel. Haenk. **1**: 308. 1830.

TYPE LOCALITY: "Hab. ad Acapulco, Mexico."

RANGE: Washington to Mexico.

SPECIMENS EXAMINED: Near Bingen, *Suksdorf* 2320.

ZONAL DISTRIBUTION: Upper Sonoran.

4. **Panicum scribnerianum** Nash, Bull. Torr. Club **22**: 421. 1895.

Panicum scoparium minor Scribn. Bull. Univ. Tenn. **7**: 48. 1894, not *Panicum pubescens minus* Poir. : Lam. Encycl. **4**: 272. 1816.

TYPE LOCALITY: "Middle Tennessee."

RANGE: Maine to Washington, south to Alabama and Arizona.

SPECIMENS EXAMINED: Alki Point, *Piper* 804; Seattle, *Smith* 804; Tacoma, *Flett* 11; American Lake, *Smith*, May, 1890; between Olympia and Gate City, *Heller* 4058; Cascade Mountains, 49°, *Lyall* in 1859, Ophir, *Elmer* 509; Old Fort Colville, *Watson* 443; Wawawai, *Elmer* 763; *Brodie*, June, 1898.

ZONAL DISTRIBUTION: Upper Sonoran and Transition.

All references of *Panicum scoparium* Lam. to Washington refer to *P. scribnerianum*. With little doubt also the Columbia River specimens referred by Hooker to *P. viscidum* Ell. are the same.

5. **Panicum occidentale** Scribn. Ann. Rep. Mo. Bot. Gard. **10**: 48. 1899.

Panicum pubescens Lam. err. det. Presl, Rel. Haenk. **1**: 306. 1830.

TYPE LOCALITY: "Hab. in Nootka-Sund," Vancouver Island.

RANGE: British Columbia, Washington, and Idaho.

SPECIMENS EXAMINED: Cascade Mountains, 49°, *Lyall* in 1859; Woodlawn, *Henderson*, June 22, 1892; Yelm, *Smith*, July 20, 1890, Enumclaw, *Vasey* 72; Montesano, *Heller* 3978;

Union City, *Piper* 939; Coulee City, *Lake & Hull* 118; Chelan, *Elmer* 489; Wenache, *Whited* 1249; Tumwater Canyon, *Whited*, August, 1901; Little Baldy, Spokane County, *Kreager* 160; Mason County, *Piper* 939; Kiona, *Cotton* 736; Toppenish, *Cotton* 792.

ZONAL DISTRIBUTION: Transition.

Specimens of this species have been referred to *P. nitidum* Lam. and to *P. dichotomum*, L. species not known to occur within our limits.

PANICUM VIRGATUM L. is stated by Hooker to have been collected on the Columbia by Douglas. There is no recent evidence of such occurrence of the species.

CHAETOCHLOA.

1. **Chaetochloa viridis** (L.) Scribn. U. S. Dept. Agr. Div. Agrost. Bull. **4**: 39. 1897. GREEN FOXTAIL.

Panicum viride L. Sp. Pl. ed. 2. 83. 1762.

Setaria viridis Beauv. Agrost. 51, 178. 1812.

TYPE LOCALITY: "Habitat in Europa australi."

SPECIMENS EXAMINED: North Yakima, *Watt*; Parker, *A. D. Dunn*; Pullman, *Piper*; Waitsburg, *Horner*; Seattle, *Piper*.

PHALARIS.

Inflorescence a narrow panicle .... 1. *P. arundinacea*.
Inflorescence an ovoid spike .... 2. *P. canariensis*.

1. **Phalaris arundinacea** L. Sp. Pl. 1: 55. 1753. REED CANARY GRASS.

TYPE LOCALITY: European.

RANGE: British Columbia to Nova Scotia, southward to New Jersey, Kansas, and California.

SPECIMENS EXAMINED: Cascades, *Lyall* in 1859; Wenache region, *Brandegee* 1153, *Whited* 1425; Ellensburg, *Piper*, June, 1897; *Whited* 563; Columbia River, Klickitat County, *Suksdorf* 1186; Spokane River, *Piper* 2386; Big Meadow, *Kreager* 425; Lake Chelan, *Vasey* 52, 552; Colville Reservation, *Griffiths & Cotton* 367; Brewster, *Griffiths & Cotton* 263.

ZONAL DISTRIBUTION: Arid Transition.

2. **Phalaris canariensis** L. Sp. Pl. 1: 54. 1753. CANARY GRASS.

TYPE LOCALITY: "Hab. in Europa australi, Canariis."

SPECIMENS EXAMINED: Pullman, *Hardwick*, July, 1895.

ANTHOXANTHUM.

1. **Anthoxanthum odoratum** L. Sp. Pl. 1: 28. 1753. SWEET VERNAL GRASS.

TYPE LOCALITY: "Habitat in Europae pratis."

SPECIMENS EXAMINED: Tacoma, *Piper*, September 5, 1895.

SAVASTANA.

1. **Savastana odorata** (L.) Scribn. Mem. Torr. Club **5**: 34. 1894. VANILLA GRASS.

Holcus odoratus L. Sp. Pl. **2**: 1048. 1753.

Hierochloe borealis Roem. & Schult. Syst. **2**: 513. 1817.

TYPE LOCALITY: European.

RANGE: Newfoundland to Alaska, south to Washington, Colorado, and Wisconsin.

SPECIMENS EXAMINED: Ellensburg, *Whited* 292; North Yakima, *Leckenby*, April 22, 1897; Fort Colville, *Lyall* in 1861; Wenache River, *Vasey* 229.

ZONAL DISTRIBUTION: Transition.

ARISTIDA.

1. Aristida purpurea robusta (Merrill).

Aristida longiseta robusta Merrill, U. S. Dept. Agr. Div. Agrost. Circ. **34**: 5. 1901.

TYPE LOCALITY: "Indian Creek, Montana."

RANGE: South Dakota to British Columbia, south to Nebraska and Wyoming.

SPECIMENS EXAMINED: Alma, *Elmer* 536; Rock Island, *Sandberg & Leiberg* 439; Spokane, *Piper* 2597; Wawawai, *Brodie*, July, 1898; Kelly's Bar, Snake River, *Brodie*, July, 1898; Cow Creek, *Griffiths & Cotton* 288; Lyons Ferry, *Griffiths & Cotton* 547.

ZONAL DISTRIBUTION: Upper Sonoran and Arid Transition.

Nuttall's type of *A. purpurea* in the Philadelphia Academy of Sciences was, in my opinion, misunderstood by Mr. Merrill. The type certainly belongs to the group of forms Merrill includes under *A. longiseta* Steud., and has nothing to do with the species with which Merrill associates the name *purpurea*.

STIPA.

- Awns 10 to 20 times longer than the lemmas.
  - Plants glabrous.. 8. *S. comata.*
  - Plants pubescent.. 8a. *S. comata intonsa.*
- Awns 4 to 7 times longer than the lemma.
  - Awns plumose.
    - Ligule 1 mm. long or less.
      - Sheaths glabrous.. 1. *S. occidentalis.*
      - Sheaths pubescent.. 2. *S. elmeri.*
    - Ligule 2 to 4 mm. long.. 3. *S. thurberiana.*
  - Awns only slightly pubescent or scabrous.
    - Callus very short, obtuse; spikelets stout................ 4. *S. lemmoni.*
    - Callus acute or acuminate.
      - Sheaths pubescent.. 5. *S. williamsii.*
      - Sheaths smooth or only scabrous.
        - Awns 1 to 3 cm. long.. 6. *S. minor.*
        - Awns 3.5 to 6 cm. long.. 7. *S. nelsoni.*

1. Stipa occidentalis Thurb. Bot. King Explor. 380. 1871.

Stipa stricta Vasey, Bull. Torr. Club **10**: 42. 1883.

Stipa stricta sparsiflora Vasey, Contr. Nat. Herb. **3**: 51. 1892.

Stipa oregonensis Scribner, U. S. Dept. Agr. Div. Agrost. Bull. **17**: 130. 1899.

TYPE LOCALITY: "Yosemite Trail, California."

RANGE: Washington to Nevada and California.

SPECIMENS EXAMINED: Ellensburg, *Piper* 2583; Twenty-five Mile Creek, Okanogan County, *Gorman* 617; Clealum, *Henderson* 2254; Mount Adams, *Henderson* 2256; Ophir, *Elmer* 515; without locality, *Suksdorf* in 1882; Mount Baldy, *Cotton* 1755; Wenache Mountains, *Cotton* 1675; Stehekin, *Griffiths & Cotton* 21.

ZONAL DISTRIBUTION: Arid Transition.

2. Stipa elmeri Piper & Brodie, U. S. Dept. Agr. Div. Agrost. Bull. **11**: 46. 1898.

Stipa viridula pubescens Vasey, Contr. Nat. Herb. **3**: 50. 1892, not *Stipa pubescens* R. Br. 1810.

TYPE LOCALITY: Empire City, Nevada, according to the label on the type specimens.

RANGE: Washington to Nevada.

SPECIMENS EXAMINED: West Klickitat County, *Suksdorf*, June 17, 1883; Nile, *Henderson* 2253; Cascade Mountains, *Vasey* in 1889; Chelan, *Elmer* 487; Ophir, *Elmer*, August, 1897; Spokane, *Piper* 2276, 2601; Steamboat Rock, *Griffiths & Cotton* 441.

ZONAL DISTRIBUTION: Arid Transition.

3. Stipa thurberiana Piper, U. S. Dept. Agr. Div. Agrost. Circ. **27**:10. 1900.

Stipa occidentalis Thurb. Bot. Wilkes Exped. 483. 1874, not Thurb. Bot. King Explor. 380. 1871.

TYPE LOCALITY: "North Branch of the Columbia." Collected by the Wilkes Expedition.

RANGE: Washington to Nevada and California.

SPECIMENS EXAMINED: Wenache, *Whited* 1230; Sunnyside, *Cotton* 487; North Yakima, *Leckenby*, May, 1898; *Henderson* 2255; Ellensburg, *Piper* 2611; North Branch Columbia River, *Wilkes Expedition*; Douglas County, *Sandberg & Leiberg* 269; Wilson Creek, *Sandberg & Leiberg*, June, 1893; between Coulee City and Waterville, *Spillman*, May, 1896; Spokane, *Piper* 2613; Coulee City, *Piper* 3919; Ephrata, *Griffiths & Cotton* 477; Yakima, *Griffiths & Cotton* 50.

ZONAL DISTRIBUTION: Upper Sonoran and Arid Transition.

4. Stipa lemmoni (Vasey) Scribn. U. S. Dept. Agr. Div. Agrost. Circ. **30**: 3. 1901.

Stipa pringlei lemmoni Vasey, Contr. Nat. Herb. **3**: 55. 1892.

Stipa lemmoni jonesii Scribn. U. S. Dept. Agr. Div. Agrost. Circ. **30**: 4. 1901.

TYPE LOCALITY: Mohawk Valley, Plumas County, California, according to the label of the type specimen.

RANGE: Washington to California.

SPECIMENS EXAMINED: West Klickitat County, *Suksdorf* 146, 56; Simcoe Mountains, *Howell* 8; Wenache Mountains, *Cotton* 1263; Perkins Creek, *Cotton* 1613.

ZONAL DISTRIBUTION: Arid Transition.

5. Stipa williamsii Scribn. U. S. Dept. Agr. Div. Agrost. Bull. **11**:45. 1898.

TYPE LOCALITY: Dry soil on the west side of Big Horn Mountain, near Monument Spring, Wyo.

RANGE: Washington to Oregon and Wyoming.

SPECIMENS EXAMINED: Colville Reservation, *Griffiths & Cotton* 390; Loomis, *Griffiths & Cotton* 328, 335.

ZONAL DISTRIBUTION: Arid Transition.

6. Stipa minor (Vasey) Scribn. U. S. Dept. Agr. Div. Agrost. Bull. **11**: 46. 1898.

Stipa viridula minor Vasey, Contr. U. S. Nat. Herb. **3**: 50. 1892.

TYPE LOCALITY: Kelso Mountain, near Torrey Peak, Colorado, according to the label of the type specimen.

RANGE: Washington to Colorado and Wyoming.

SPECIMENS EXAMINED: Olympic Mountains, *Elmer* 1900; Mount Adams, *Suksdorf* 147; Nisqually, *Wilkes Expedition*; Steptoe, *Vasey*, June, 1900; Palouse City, *F. D. Cloud*, June, 1895; Pullman, *Piper* 1762; Brewster, *Griffiths & Cotton* 258, 259; Colville Reservation, *Griffiths & Cotton* 391; Wenache Mountains, *Cotton* 1304.

ZONAL DISTRIBUTION: Transition, mostly Arid.

7. Stipa nelsoni Scribn. U. S. Dept. Agr. Div. Agrost. Bull. **11**: 46. 1898.

TYPE LOCALITY: "Woods Landing, Albany County, Wyoming"

RANGE: Washington and Oregon to Wyoming.

SPECIMENS EXAMINED: Rattlesnake Mountains, *Cotton* 687; Cow Creek, *Griffiths & Cotton* 517; Steamboat Rock, *Griffiths & Cotton* 433.

ZONAL DISTRIBUTION: Arid Transition.

8. Stipa comata Trin. & Rupr. Gram. Agrost. **3**: 75. 1842.

Stipa juncea L. err. det. Nutt. Gen. **1**: 58. 1818.

Stipa capillata L. err. det. Hook. Fl. Bor. Am. **2**: 237. 1839.

TYPE LOCALITY: "Carlton House Fort ad fl. Saskatchawan."

RANGE: British Columbia to Alberta southward to California and New Mexico.

Specimens examined: Douglas County, *Spillman*, May, 1896; *Sandberg & Leiberg*, 240; Wenache, *Whited* 1130, 1229; North Yakima, *Mrs. Steinweg;* Connell, *Leckenby*, June, 1897; Spokane, *Piper* 2600; Pasco, *Piper* in 1897; Snipes Mountain, *Cotton* 379; Kittitas County, *Vasey* 121; Eltopia, *Cotton* 1017; Ephrata, *Griffiths & Cotton* 495; Brewster, *Griffiths & Cotton* 254.

Zonal distribution: Upper Sonoran.

8a. Stipa comata intonsa subsp. nov.

Differs from *S. comata* in having the leaves densely puberulent.

Specimens examined: Near Rockland, Klickitat County, *Suksdorf* 1026, type.

ORYZOPSIS.

Low alpine species with narrow strict panicles.
  Awn of the lemma 3 to 4 mm. long .... 1. *O. exigua.*
  Awn of the lemma 10 to 12 mm. long .... 2. *O. hendersoni.*
Tall lowland plants with loose panicles.
  Glumes equal, cuspidate; awn 3 to 5 mm. long .... 4. *O. hymenoides.*
  Glumes equal; awn 10 to 15 mm. long .... 3. *O. bloomeri.*

1. **Oryzopsis exigua** Thurb. Bot. Wilkes Exped. 481. 1874.

Type locality: "Cascade Mountains, Oregon."

Range: Washington, Idaho, Oregon.

Specimens examined: State of Washington, *Suksdorf*, in 1883; Cascade Mountains, Kittitas County, *Vasey* 34.

Zonal distribution: Hudsonian or Arctic.

This grass grows in granitic sand near timber line.

2. **Oryzopsis hendersoni** Vasey, Contr. Nat. Herb. 1: 267. 1893.

Type locality: "In Washington." Collected by Henderson (no. 2249).

Range: Known only from the type collection.

Specimens examined: Summit of Mount Cleman, *Henderson* 2249.

3. **Oryzopsis bloomeri** (Boland.) Ricker.

Stipa bloomeri Boland. Proc. Cal. Acad. 4: 168. 1872.

Type locality: "Bloody Cañon, near Mono Lake," California.

Range: Washington to Montana and California.

Specimens examined: Douglas County, *Sandberg & Leiberg* 231.

Zonal distribution: Arid Transition.

4. **Oryzopsis hymenoides** (Roem. & Schult.) Ricker.

Stipa hymenoides Roem. & Schult. Syst. 2: 339. 1817.

Eriocoma cuspidata Nutt. Gen. 1: 40. 1818.

Stipa membranacea Pursh, Fl. 2: 728. 1814, not L. 1753.

Oryzopsis membranacea Vasey, U. S. Dept. Agr. Div. Bot. Bull. 12: *pl. 10.* 1891.

Eriocoma membranacea Beal, Grasses N. Am. 2: 232. 1896.

Oryzopsis cuspidata Benth; Vasey, U. S. Dept. Agr. Spec. Rep. 63: 23. 1883.

Type locality: "On the banks of the Missouri."

Range: British Columbia to California, east to Alberta and New Mexico.

Specimens examined: Douglas County, *Spillman*, May, 1896; *Sandberg & Leiberg*, 281; Ellensburg, *Piper*, May, 1897; North Yakima, *Henderson*, May, 1892; *Mrs. Steinweg* in 1894; Pasco, *Piper* 2964; *Hindshaw* 33; Sunnyside, *Cotton* 416; Rattlesnake Mountains, *Cotton* 421; Walla Walla, *Lyall*, June, 1860; Sprague, *Sandberg & Leiberg*, June, 1893; Kittitas County, *Vasey* 85; Wallula, *Cotton* 1030, 1048.

Zonal distribution: Upper Sonoran.

MUHLENBERGIA.

Lemmas acuminate.. 1. *M. racemosa.*
Lemmas long-awned.
  Hairs of the callus equaling the lemma.............................. 2. *M. comata.*
  Hairs of the callus much shorter than the lemma.................. 3. *M. sylvatica.*

1. **Muhlenbergia racemosa** (Michx.) B. S. P. Prel. Cat. N. Y. 67. 1888.

Agrostis racemosa Michx. Fl. 1: 53. 1803.

Muhlenbergia glomerata Trin. Gram. Unifl. 191. 1824.

Polypogon glomeratus Willd. Enum. Hort. Berol. 87. 1809.

TYPE LOCALITY: "Hab. in ripis sabulosis inundatis fluminis Mississippi."

RANGE: Newfoundland to British Columbia, south to New Jersey, Missouri, and New Mexico.

SPECIMENS EXAMINED: Sumas Prairie, *Lyall* in 1858–9; Loomis, *Elmer*, August, 1897; Wenache Valley, *Sandberg & Leiberg* 594; Parker, *A. D. Dunn;* Cascade Mountains, *Vasey* 140.

ZONAL DISTRIBUTION: Transition.

2. **Muhlenbergia comata** (Thurb.) Benth.; Vasey, Desc. Cat. Grasses U. S. 39. 1885.

Vaseya comata Thurb. Proc. Acad. Phila. **1863**: 79. 1863.

TYPE LOCALITY: "A native of the plains of Nebraska."

RANGE: Colorado to Washington and California.

SPECIMENS EXAMINED: Loomis, *Elmer* 558.

ZONAL DISTRIBUTION: Arid Transition.

3. **Muhlenbergia sylvatica setiglumis** S. Wats. Bot. King Explor. 378. 1871.

TYPE LOCALITY: "Near Warm Springs in Humboldt Pass, Nevada; 6,000 feet altitude."

RANGE: Washington to Nevada.

SPECIMENS EXAMINED: Spokane, *Piper*, September 1, 1899; Phileo Lake, Spokane County, *Suksdorf* 948.

ZONAL DISTRIBUTION: Arid Transition.

ALOPECURUS.

Awns scarcely exceeding the glumes; spikelets 2 to 2.5 mm. long.. 1. *A. geniculatus fulvus.*
Awns much exceeding the glumes.
  Spikelets 3 mm. long; anthers orange......................... 2. *A. californicus.*
  Spikelets 4 mm. long; anthers white.......................... 3. *A. saccatus.*

1. **Alopecurus geniculatus fulvus** (Smith) Sonder, Fl. Hamb. 32. 1851.

Alopecurus fulvus J. E. Smith, Engl. Bot. **21**: *pl. 1467.* 1805.

Alopecurus aristulatus Michx. Fl. 1: 43. 1803.

Alopecurus geniculatus aristulatus Torr. Fl. U. S. 1: 97. 1824.

Alopecurus geniculatus robustus Vasey, Bull. Torr. Club **15**: 13. 1888.

TYPE LOCALITY: England.

RANGE: British Columbia to Newfoundland, southward to Florida, Tennessee, and California. Europe.

SPECIMENS EXAMINED: Coupeville, *Gardner* 333; Seattle, *Piper* 793; *Smith*, June, 1890; Tacoma, *Flett* 14, 183; *Leckenby*, May 29, 1897; Clallam County, *Elmer* 1663; Alma, *Elmer* 548; Ellensburg, *Vasey* 118; North Yakima, *Henderson*, May 26, 1892; *Watt*, August, 1895; Klickitat County, *Suksdorf* 1066; Boundary, *T. F. O'Hara*; Usk, *Kreager* 356; Spokane, *Dewart*, June 5, 1901; Asotin Creek, *Hunter* 93; Waitsburg, *Horner* 214.

ZONAL DISTRIBUTION: Transition.

2. **Alopecurus californicus** Vasey, Bull. Torr. Club **15**: 13. 1888.

Alopecurus pallescens Piper, Fl. Palouse Reg. 18. 1901.

TYPE LOCALITY: Santa Cruz, California, according to label on the type specimen.

Range: Washington and Idaho to California.

Specimens examined: Spokane, *Wilkes Expedition;* Pullman, *Piper* 1743; Whitman County, *Lake & Hull*, July 7, 1892; *Sandberg & Leiberg* 108; West Klickitat County, *Suksdorf* 2117.

Zonal distribution: Arid Transition.

3. **Alopecurus saccatus** Vasey, Bot. Gaz. 6: 290. 1881.

Type locality: "Eastern Oregon." Collected by Howell.

Range: Eastern Washington and eastern Oregon.

Specimens examined: Lyle, *Leckenby*, May 21, 1899; near Spangle, *Piper*, 3553.

Zonal distribution: Arid Transition.

PHLEUM.

Spike cylindric; awns of glumes short	1. *P. pratense.*
Spike ovate-oblong; awn as long as body of glume	2. *P. alpinum.*

1. **Phleum pratense** L. Sp. Pl. 1: 59. 1753. Timothy.

Type locality: "Habitat in Europae versuris et pratis."

Specimens examined. Seattle, *Piper* 789; Colville, *Lyall* in 1860; Pullman, *Hardwick* July, 1895.

2. **Phleum alpinum** L. Sp. Pl. 1: 59. 1753. Mountain timothy.

Type locality: "Habitat in Alpibus."

Range: Alaska to Labrador, southward to New Hampshire, Arizona, and California. Europe. Patagonia.

Specimens examined: Olympic Mountains, *Elmer*, 1901; Mount Rainier, *Piper* 1953; *Allen*, July 20, 1892; Mount Stuart, *Sandberg & Leiberg* 814 and August, 1893; Wenache Mountains, *Elmer* 441; Cascade Mountains above Lake Chelan, *Lake & Hull* 115; Cascade Mountains to Fort Colville, *Lyall* in 1860; Cascade Mountains, *Vasey* 393.

Zonal distribution: Arctic and Hudsonian.

POLYPOGON.

Glumes notched at apex, their awns 2 to 3 times as long; panicle dense, cylindric	1. *P. monspeliensis.*
Glumes attenuate into awns of equal length; panicle lobed or interrupted	2. *P. littoralis.*

1. **Polypogon monspeliensis** (L.) Desf. Fl. Atl. 1:67. 1800.

Alopecurus monspeliensis L. Sp. Pl. 1:61. 1753.

Type locality: "Habitat monspelii."

Range: British Columbia to Mexico. Europe. Naturalized in the Atlantic States.

Specimens examined: Olympics, *Elmer* 1934; South Bend, *Spillman*, August 17, 1899; Seattle, *Piper* 792; Tacoma, *Flett* 7; Parker, *Dunn;* North Yakima, *Watt*, August, 1895; Alma, *Elmer* 532; Douglas County, *Sandberg & Leiberg* 280; Waitsburg, *Horner* 523; Illia, *W. R. Hull* 90; Almota, *Piper*, June, 1894; Spokane, *Sandberg, Heller, & MacDougal* 920; Steptoe, *Vasey* 56; Ellensburg, *Vasey* 494.

Zonal distribution: Upper Sonoran and Transition.

2. **Polypogon littoralis** (With.) Smith, Comp. Fl. Brit. ed. 2. 13. 1816.

Agrostis littoralis With. Bot. Arr. Brit. Veg. ed. 3. 2: 129. 1796.

Type locality: "Wells, on the Norfolk coast," England.

Range: Vancouver Island to California and on the Atlantic and Gulf coasts.

Specimens examined: Olympic Mountains, *Elmer* 1955; Tacoma, *Flett* 8.

Zonal distribution: Humid Transition.

SPOROBOLUS.

Panicle contracted, spike-like.
Annuals, culms slender or filiform........................ 1. *S. filiformis.*
Perennials.
Sheaths inflated, usually inclosing base of panicle... 2. *S. vaginaeflorus neglectus.*
Sheaths not inflated.
Glumes one-third to one-half the length of the lemma.................................... 3. *S. richardsoni.*
Glume from two-thirds to almost the whole length of the lemma................................ 4. *S. depauperatus.*
Panicle open, branches mostly spreading.
Annuals, culms slender, pedicels longer than spikelets.... 5. *S. confusus.*
Perennials.
Panicle branches close-flowered nearly to base; pedicels equaling to shorter than spikelets............ 6. *S. cryptandrus.*
Panicle branches few-flowered, naked below.
Pedicels smooth, seldom more than twice the length of the spikelet....................... 7. *S. airoides.*
Pedicels scabrous, 3 to many times the length of the spikelet.............................. 8. *S. asperifolius.*

1. **Sporobolus filiformis** (Thurb.) Rydberg. Contr. Nat. Herb. **3**: 189. 1895.
Vilfa depauperata filiformis Thurb. Bot. King Explor. 376. 1871.
Vilfa gracillima Thurb. in Wats. Bot. Cal. **2**: 268. 1880.
Sporobolus gracillimus Vasey, Descr. Cat. Grasses U. S. 44. 1885.
TYPE LOCALITY: Yosemite Valley, California.
RANGE: Washington to California and Colorado.
SPECIMENS EXAMINED: Glenwood, *Flett* 1396; Mount Adams, *Henderson*, August 3, 1892; *Howell* 84; Falcon Valley, *Suksdorf* 13.
ZONAL DISTRIBUTION: Hudsonian.

2. **Sporobolus vaginaeflorus neglectus** Scribn. U. S. Dept. Agr. Div. Agrost. Bull. 17. rev. ed. 170. 1901.
Sporobolus neglectus Nash, Bull. Torr. Club **22**: 464. 1895.
TYPE LOCALITY: None given.
RANGE: Washington to Massachusetts, Tennessee, and Kansas.
SPECIMENS EXAMINED: Myers Falls, *Kreager* 590.
ZONAL DISTRIBUTION: Transition.

3. **Sporobolus richardsoni** (Trin.) Merrill, Rhodora **4**: 46. 1902.
Vilfa richardsoni Trin. Mem. Acad. St. Petersb. VI. **6^2**: 103. 1840.
TYPE LOCALITY: "Amer. boreal." Richardson.
RANGE: British Columbia to Labrador, south to California and New Mexico.
SPECIMENS EXAMINED: Ellensburg, *Piper* 2581; Parker, *Dunn*, August 8, 1901; Medical Lake, *Henderson* 2251; Grand Coulee, *Griffiths & Cotton* 359; Prosser, *Cotton* 636; Colville Reservation near Mount Bonaparte, *Griffiths & Cotton* 359; Grand Coulee, *Griffiths & Cotton* 434.
ZONAL DISTRIBUTION: Transition and Upper Sonoran.

4. **Sporobolus depauperatus** (Torr.) Scribn. Bull. Torr. Club **9**: 103. 1882.
Vilfa depauperata Torr.; Hook. Fl. Bor. Am. **2**: 257. 1840.
Vilfa squarrosa Trin. Mem. Acad. St. Petersb. VI. **6^2**: 100. 1840.
TYPE LOCALITY: "N. W. America. Barren sandy parts of the Columbia from Menzies' island upwards." Collected by Douglas.
RANGE: Oregon and Washington to Montana.

Specimens examined: "N. W. coast," *Douglas:* Pullman, *Piper* 1926; *Henderson* 2250; Almota, *Piper*, September, 1896.

Zonal distribution: Upper Sonoran and Arid Transition.

5. **Sporobolus confusus** (Fourn.) Vasey, Bull. Torr. Club **15**: 293. 1888.

Vilfa confusa Fourn. Mex. Pl. Enum. Gram. 101. 1886.

Type locality: "In devexis arenosis montis ignivomi *Jorullo*," Mexico.

Range: Washington to Arizona, Texas, and Mexico.

Specimens examined: Parker, Yakima County, *Elmer* 1076.

Zonal distribution: Upper Sonoran.

6. **Sporobolus cryptandrus** (Torr.) Gray, Man. 576. 1848.

Agrostis cryptandrus Torr. Ann. Lyc. N. Y. **1**: 151. 1824.

Vilfa tenacissima fuscicolor Hook. Fl. Bor. Am. **2**: 239. 1840.

Type locality: "On the Canadian river."

Range: Washington to Maine southward to Texas.

Specimens examined: Cascade Mountains, central Washington, *Vasey* 132; Klickitat County, *Suksdorf* 1019; Wawawai, *Elmer* 760; near Ellensburg, *Vasey* 465; Kiona, *Cotton* 726; Sentinel Bluffs, *Cotton* 1353.

Zonal distribution: Upper Sonoran in Washington.

7. **Sporobolus airoides** Torr. Pac. R. Rep. 7^3: 21. 1856.

Agrostis airoides Torr. Ann. Lyc. N. Y. **1**:151. 1824.

Type locality: "On the branches of the Arkansas, near the Rocky Mountains."

Range: Washington to Nebraska, south to California and Arizona.

Specimens examined: Near Oroville, Okanogan River, *Griffiths & Cotton* 350. This is the northernmost station known.

Zonal distribution: Upper Sonoran.

8. **Sporobolus asperifolius** (Nees & Meyen) Thurb. in Wats. Bot. Cal. **2**: 269. 1880.

Vilfa asperifolia Nees & Meyen, Mem. Acad. St. Petersb. VI. 6^2: 95. 1840.

Type locality: "Chile; Rio Mayno; Copiapo."

Range: British Columbia to Assiniboia southward to California and Missouri.

Specimens examined: Alma, *Elmer* 549; Coulee City, *Lake & Hull*, August, 1892; Wilson Creek, *Lake & Hull* 99; Alkali Lake, *Sandberg & Leiberg*, July, 1893; Ellensburg, *Piper* 2580; North Yakima, *Henderson* 2218; Union Gap, Yakima River, *Cotton* 492; North Yakima, *Watt* in 1895; Cascade Mountains, *Vasey* 525; Toppenish, *Cotton* 804; Priest Rapids, *Cotton* 1403.

Zonal distribution: Upper Sonoran.

Sporobolus cuspidatus Wood, Bot. & Flor. 385. 1874. (*Vilfa cuspidata* Torr.; Hook. Fl. Bor. Am. **2**: 238. 1839.) This is included in Suksdorf's List, but no Washington specimens have been seen by us.

CINNA.

1. **Cinna latifolia** (Trev.) Griseb. in Ledeb. Fl. Ross. **4**: 435. 1853.

Agrostis latifolia Trev.; Goepp. Beschr. Bot. Gaert. in Breslau 82. 1830.

Cinna pendula Trin. Mem. Acad. St. Petersb. VI. 6^2: 280. 1841.

Cinna pendula glomerula Scribn. Proc. Acad. Phila. **1884**: 290. 1885.

Cinna latifolia glomerata Beal, Grasses N. Am. **2**: 319. 1896.

Range: Alaska to Oregon, Colorado, New England, and Carolina.

Specimens examined: Cascade Mountains, 49°, *Lyall* in 1859; Seattle, *Piper* 821; Montesano, *Heller* 4017; Longmire Springs, Mount Ranier, *Piper* 1982; Lake Cushman, *Piper* 1991; Railroad Creek, Okanogan County, *Elmer* 719; Coulee City, *Lake & Hull* 114, Nason City, *Sandberg & Leiberg*, July, 1893; Okanogan County, *Sandberg & Leiberg* 581; Blue Mountains, *Piper*, July, 1896; Salmon River, Blue Mountains, *Horner* 494.

Zonal distribution: Transition and Canadian.

COLEANTHUS.

1. **Coleanthus subtilis** (Tratt.) Seidel; Roem. & Schult. Syst. 2: 276. 1817.
Schmidtia subtilis Tratt. Fl. Austr. 1: 12. 1816.
TYPE LOCALITY: "In der gegend von Wosseck," Bohemia.
RANGE: Along the lower Columbia River. Also in Europe.
SPECIMENS EXAMINED: Klickitat County, *Suksdorf* 280.
ZONAL DISTRIBUTION: Humid Transition.

CALAMAGROSTIS.

Awn strongly geniculate; callus hairs much shorter than the lemma.
Awn greatly exceeding the glumes.
Panicle loose; leaves nearly as long as the culms........... 1. *C. howellii.*
Panicle dense; leaves shorter than the culms.
Leaves soft, flat.................................. 4. *C. tweedyi.*
Leaves hard, closely involute.
Glumes scabrous all over......................... 2. *C. purpurascens*
Glumes nearly smooth............................ 3. *C. vaseyi.*
Awn shorter than or a little exceeding the glumes.
Glumes strongly keeled; tall seashore plant................ 5. *C. aleutica.*
Glumes not strongly keeled.
Panicle dense, purple................................ 6. *C. rubescens.*
Panicle dense, pale green.............................. 7. *C. suksdorfii.*
Awn straight; callus hairs not much shorter than the lemma.
Panicle loose and open.
Spikelets 4 to 6 mm. long.............................. 9. *C. langsdorfii.*
Spikelets 2 to 4 mm. long.
Glumes 2 to 2.5 mm. long........................... 12. *C. macouniana.*
Glumes 3 to 4 mm. long.
Awn attached near the middle of the lemma...... 10. *C. canadensis.*
Awn attached near the apex of the lemma........ 11. *C. blanda.*
Panicle narrow, rather close.
Callus hairs copious; sheaths bearded at summit.......... 13. *C. scribneri.*
Callus hairs sparse.
Leaf blades soft, not rigid............................ 14. *C. neglecta.*
Leaf blades rigid.
Panicle rather loose.............................. 15. *C. inexpansa.*
Panicle dense, spike-like.
Glumes subcoriaceous, ovate, acute; panicle 4 to 6 cm. long......................... 16. *C. crassiglumis.*
Glumes membranous, acuminate, panicle 5 to 20 cm. long......................... 17. *C. hyperborea.*

1. **Calamagrostis howelli** Vasey, Bot. Gaz. 6: 271. 1881.
TYPE LOCALITY: "Oregon." Collected by Howell.
RANGE: Washington and Oregon.
SPECIMENS EXAMINED: Larm River, *Suksdorf* 13; Cape Horn, *Piper*.
ZONAL DISTRIBUTION: Humid Transition.
Abundant on the perpendicular cliffs of the Columbia Gap, but not known elsewhere.

Calamagrostis purpurascens R. Br. in Richards. Bot. App. Frankl. Journ. 731. 1823.
Calamagrostis sylvatica DC. err. det. A. Gray, Proc. Am. Acad. 6: 80. 1866.
Calamagrostis sylvatica americana Vasey, Contr. Nat. Herb. 3: 83. 1892.
TYPE LOCALITY: British America between Point Lake and the Arctic Sea.
E: Alaska to Greenland, southward to the Black Hills, Colorado, and California

Specimens examined: Mount Stuart, *Sandberg & Leiberg* 825; Mount Chapaca, *Elmer* 555; Wenache region, *Tweedy* 650.

Zonal distribution: Hudsonian.?

3. **Calamagrostis vaseyi** Beal, Grasses N. Am. **2**: 344. 1896.

Calamagrostis purpurascens R. Br. err. det. Vasey, Contr. Nat. Herb. **3**: 83. 1892.

Type locality: "Cascade Mountains of Washington." Collected by G. R. Vasey.

Range: Washington and Oregon.

Specimens examined: Olympic Mountains, *Piper* 1984, 1983; Mount Ranier, *Piper* 1956, 1957, 1955; Goat Mountains, *Allen* 177; Skamania County, *Suksdorf* 1025; *Flett* 1384, 1390.

Zonal distribution: Arctic.

The "*Deyeuxia sylvatica* Kth." of Suksdorf's list is *Calamagrostis vaseyi* Beal.

4. **Calamagrostis tweedyi** Scribn. Contr. Nat. Herb. **3**: 83. 1892.

Deyeuxia tweedyi Scribn. Bull. Torr. Club **10**: 64. 1883.

Type locality: "Cascade Mountains, Washington." Collected by Tweedy.

Range: Cascade Mountains, Washington.

Specimens examined: Cascade Mountains, *Tweedy; Vasey* in 1889.

5. **Calamagrostis aleutica** Trin. in Bong. Mem. Acad. St. Petersb. VI. **2**: 171. 1832.

Calamagrostis albicans Buckl. Proc. Acad. Phila. **1862**: 92. 1863.

Calamagrostis pallida Nutt.; A. Gray, Proc. Acad. Phila. **1862**: 334. 1863.

Deyeuxia breviaristata Vasey, Bull. Torr. Club **15**: 48. 1888.

Type locality: "Unalaschka."

Range: Alaska to California.

Specimens examined: Westport, *Henderson*, June, 1892; Granville, *Conard* 335.

Zonal distribution: Humid Transition.

6. **Calamagrostis rubescens** Buckl. Proc. Acad. Phila. **1862**: 92. 1863.

Deyeuxia varia Kunth, err. det. Scribn. Bull. Torr. Club **9**: 45. 1882.

Type locality: "Oregon." Collected by Nuttall.

Range: British Columbia and Alberta to California.

Specimens examined: Blue Mountains, *Horner* 493; *Lake & Hull* 74; Lake Omack, *Griffiths & Colton* 389; Cascade Mountains, *Vasey* in 1889.

Zonal distribution: Arid Transition.

7. **Calamagrostis suksdorfii** Scribn. Contr. Nat. Herb. **3**: 82. 1892.

Deyeuxia suksdorfii Scribn. Bull. Torr. Club **15**: 9. 1888.

Type locality: According to type specimen, Falcon Valley, Washington. Collected by Suksdorf.

Range: British Columbia to California and Wyoming.

Specimens examined: Wenache Valley, *Sandberg & Leiberg* 535; Ellensburg, *Elmer* 421; Atanum River, *Henderson* 2151; east of Mount Adams, *Henderson* 2153; Twenty-five Mile Creek, Okanogan County, *Gorman* 615; North Palouse River, *Vasey*, July 3, 1901; Dry Creek, *Vasey*, July 5, 1901; Pullman, *Piper* 1919; Falcon Valley, *Suksdorf* 26, 607; Spokane County, *Suksdorf* 92.

Zonal distribution: Arid Transition.

8. **Calamagrostis suksdorfii luxurians** Kearney, U. S. Dept. Agr. Div. Agrost. Bull. **11**: 24. 1898.

Type locality: "Farmington Landing, Lake Cœur d'Alene, Idaho." Collected by Sandberg, Heller, and MacDougal.

Range: British Columbia, Washington, and Idaho.

Specimens examined: Tieton River, *Cotton* 503; Wenache, *Whited* 1418; Cascade Mountains, *Vasey;* Peshastin, *Sandberg & Leiberg*, July, 1893; Spokane, *Piper* 1918; Blue Mountains, *Piper* 2557; locality unknown, *Brandegee* 1171.

Zonal distribution: Arid Transition.

9. Calamagrostis langsdorffii Trin. Gram. Unifl. 225. *t. 4. f. 10.* 1824.

Calamagrostis oregonensis Buckl. Proc. Acad. Phila. **1862:** 92. 1863.

Calamagrostis columbiensis Nutt.; A. Gray, Proc. Acad. Phila. **1862:** 334. 1863.

Type locality: "Tobolsk," Siberia.

Range: Alaska to Greenland, south to California, New Mexico, Michigan, and North Carolina. Europe. Asia.

Specimens examined: Olympic Mountains, *Piper* 1986; *Elmer* 1671, 1672; Mount Rainier, *Smith* 981; Tatoosh Mountains, *Allen* 176; Goose Lake, *Flett* 1378; Cascade Mountains, *Henderson* 2157; *Vasey* in 1889; *Sandberg & Leiberg* 795; North Fork of Bridge Creek, *Elmer* 680; Mount Adams, *Howell* in 1882; *Suksdorf* 87, 204.

Zonal distribution: Mainly Hudsonian and Arctic.

9a. Calamagrostis langsdorffii lactea (Beal) Kearney, U. S. Dept. Agr. Div. Agrost. Bull. **11:** 28. 1898.

Calamagrostis lactea Beal, Grasses N. Am. **2:** 346. 1896.

Deyeuxia lactea Suksdorf in Beal, Grasses N. Am. **2:** 346. 1896, as synonym.

Type locality: "Washington; banks of the North Fork of Nooksack River, near Mount Baker." Collected by Suksdorf.

Range: Washington.

Specimens examined: Near Mount Baker, *Suksdorf* 1022, 1023; Falcon Valley, *Suksdorf* 206.

10. Calamagrostis canadensis (Michx.) Beauv. Agrost. 15, 157. 1812.

Arundo canadensis Michx. Fl. **1:** 73. 1803.

Type locality: "Hab. in Canada."

Range: British Columbia to Nova Scotia, southward to New Jersey, Ohio, Utah, and Oregon.

Specimens examined: Wenache region, *Brandegee* 1169; Klickitat County, *Suksdorf* 2127; Thorn Creek, Whitman County, *Vasey*, July 9, 1901; Pullman, *Brodie* August, 1898; *Piper* 3037; *Henderson* 2162; Big Meadows, *Kreager* 411; Spokane County, *Suksdorf* 86, 90a.

Zonal distribution: Transition.

10a. Calamagrostis canadensis acuminata Vasey, U. S. Dept. Agr. Div. Agrost. Bull. **5:** 26. 1897.

Type locality: Georgetown, Colorado.

Range: Alaska to Labrador, south in the mountains to California, New Mexico, and North Carolina.

Specimens examined: Cascade Mountains, *Vasey* in 1889; *Brandegee* 1168; *Lyall* in 1860; Ellensburg, *Piper*, July 9, 1897; west Klickitat County, *Suksdorf* 2127; along Salmon River, *Horner* 495; Stehekin, *Griffiths & Cotton* 196, 230; Cascade Mountains, *Vasey* in 1889; Klickitat County, *Suksdorf* 203, 205; near Mount Baker, *Suksdorf* 2166; Mount Adams, *Howell* 82; *Suksdorf* 209.

Zonal distribution: Arid Transition to Hudsonian.

11. Calamagrostis blanda Beal, Grasses N. Am. **2:** 349. 1896.

Calamagrostis pallida Vasey & Scribn. Contr. Nat. Herb. **3:** 79. 1892, not C. Muell. 1860.

Type locality: "Washington." Collected by Suksdorf.

Range: Washington to Montana.

Specimens examined: Klickitat County, *Suksdorf* 52.

12. Calamagrostis macouniana Vasey, Contr. Nat. Herb. **3:** 81. 1892.

Deyeuxia macouniana Vasey, Bot. Gaz. **10:** 297. 1885.

Type locality: "Souris Plain, Assiniboia" according to the label on the type specimen.

Range: Washington to Assiniboia and Missouri.

Specimens examined: North Palouse River, *Vasey*, March 3, 1897; Pullman, *Henderson* 2162, *Piper* 3037, *Brodie*, July, 1898; Spokane County, *Suksdorf* 1097.

Zonal distribution: Arid Transition.

13. **Calamagrostis scribneri** Beal, Grasses N. Am. 2: 343. 1896.

Deyeuxia dubia Scribn. Bot. Gaz. 11: 174. 1886.

Calamagrostis dubia Scribn. Contr. Nat. Herb. 3: 80. 1892, not Bunge; Lehm. Rel. 348. 1847.

Type locality: "Slough Creek, alt. 6,700 ft., Montana."

Range: British Columbia to Washington and Wyoming.

Specimens examined: Chiquash Mountains, *Suksdorf* 1023; Mount Adams, *Suksdorf* 145; Wenache Mountains, *Cotton* 1756.

Zonal distribution: Hudsonian?

14. **Calamagrostis neglecta** (Ehrh.) Gaertn. Meyer & Scherb. Fl. Wetterau 1: 94 1799.

Arundo neglecta Ehrh. Beitr. 6: 84, 137. 1791.

Calamagrostis stricta Koel. Descr. Gram. 105. 1802.

Calamagrostis coarctata Torr.; Hook. Fl. Bor. Am. 2: 240. 1839.

Type locality: Upsala, Sweden.

Range: Alaska to Labrador, south to Oregon, Colorado, and Maine. Europe. Asia.

Specimens examined: Spokane County, *Suksdorf* 90.

15a. **Calamagrostis inexpansa cuprea** Kearney, U. S. Dept. Agr. Div. Agrost. Bull. 11: 37. 1898.

Type locality: "In shallow water, Falcon Valley, Washington." Collected by Suksdorf.

Range: Known only from the type locality.

Specimens examined: Falcon Valley, *Suksdorf* 910.

15b. **Calamagrostis inexpansa barbulata** Kearney, U. S. Dept. Agr. Div. Agrost. Bull. 11: 37. 1898.

Type locality: "Mason County, Wash." Collected by Piper, three miles south of Union City.

Range: Known only from the type specimen.

Specimens examined: Mason County, *Piper* 947. Abundant in small wet meadows in woods of *Pinus contorta*.

16. **Calamagrostis crassiglumis** Thurb. in Wats. Bot. Cal. 2: 281. 1880.

Deyeuxia crassiglumis Vasey, Descr. Cat. Grasses U. S. 50. 1885.

Type locality: "Swamps, Mendocino County," California. Collected by Bolander.

Range: Vancouver Island to California.

Specimens examined: Whatcom Lake, *Suksdorf* 1024.

Zonal distribution: Humid Transition.

17. **Calamagrostis hyperborea** Lange, Fl. Dan. 50: *t. 2942*. 1880; Consp. Fl. Groenl. 160. 1880.

Calamagrostis stricta robusta, Vasey in Rothr.; Wheeler Rep. 6: 285. 1878, not *C. robusta* C. Muell.

Type locality: Igalico, near Julianshaab, southern Greenland.

Range: Alaska to Greenland, south to California, Arizona, and Vermont.

Specimens examined: Cascade Mountains, *Cooper*.

17a. **Calamagrostis hyperborea elongata** Kearney, U. S. Dept. Agr. Div. Agrost. Bull. 11: 40. 1898.

Type locality: "Plummer Ford, on the Dismal River, Plummer County, Nebr."

Range: British Columbia to Ontario, southward to California, Colorado, and Pennsylvania.

Specimens examined: Douglas County, *Sandberg & Leiberg* 325; Spangle, *Suksdorf* 1099, 1100; Marshall Junction, *Piper* 2254; locality unknown, *Brandegee* 1170; Endicott, *Elmer* 1028; Ephrata, *Cotton* 470; Falcon Valley, *Suksdorf* 187, 188; Spokane County, *Suksdorf* 106.

Zonal distribution: Arid Transition.

17b. Calamagrostis hyperborea americana Vasey; Kearney, U. S. Dept. Agr. Div. Agrost. Bull. **11**: 41. 1898.

Deyeuxia neglecta americana Vasey, Macoun. Cat. Can. Pl. **4**: 206. 1888, nom. nud.

Calamagrostis stricta Gray, Proc. Am. Acad. **6**: 79. 1866 in part, not Koel.

Type locality: "Donald, Columbia Valley," British Columbia. Collected by Macoun.

Range: British Columbia to Hudson Bay, southward to Oregon, Colorado, and Vermont.

Specimens examined: Brewster, *Griffiths & Cotton* 267; Conconully, *Griffiths & Cotton* 271; Stehekin, *Griffiths & Cotton* 240; Ephrata, *Griffiths & Cotton* 470.

Zonal distribution: Arid Transition.

Calamagrostis stricta Nutt. is listed in Cooper's Report, page 70. The specimen seems to be lost, but it was certainly of some other species.

AGROSTIS.

- Rachilla prolonged behind the palet.
  - Spikelets 3 mm. long, usually purple .... 1. *A. aequivalvis.*
  - Spikelets 2 mm. long, usually pale .... 2. *A. thurberiana.*
- Rachilla not prolonged behind the palet.
  - Palet evident, 2-nerved.
    - Plant spreading by creeping short-leafed stolons .... 3. *A. depressa.*
    - Plant without stolons.
      - Tufted; a dwarf high-alpine species .... 4. *A. humilis.*
      - Provided with rootstocks; culms erect, rather tall...... 5. *A. alba.*
  - Palet wanting or minute and nerveless.
    - Plant with rootstocks .... 6. *A. pallens.*
    - Plant tufted, without rootstocks.
      - Panicle narrow, rather close.
        - Lemma with exserted awn.
          - Glumes awn-pointed .... 7. *A. microphylla.*
          - Glumes merely acute........................ 8. *A. ampla.*
        - Lemma awnless or the awn included.
          - Panicle 5 to 30 cm. long; tall lowland plant.... 9. *A. exarata.*
          - Panicle 3 to 6 cm. long; low alpine plant....... 10. *A. rossae.*
      - Panicle open, loose.
        - Inflorescence very diffuse; herbage scabrous....... 11. *A. hyemalis.*
        - Inflorescence not diffuse.
          - Plants 10 to 30 cm. high; panicle usually pale.. 12. *A. idahoensis.*
          - Plants 30 to 60 cm. high.
            - Panicle pyramidal, dark purple.......... 13. *A. oregonensis.*
            - Panicle elongated, oblong............... 14. *A. schiediana.*

1. Agrostis aequivalvis Trin. Mem. Acad. St. Petersb. IV. **6^{2}**: 362. 1841.

Agrostis canina aequivalvis Trin. in Bong. Mem. Acad. St. Petersb. VI. **2**: 171. 1832.

Type locality: Sitka.

Range: Alaska to Oregon.

Specimens examined: Nason Creek, *Sandberg & Leiberg* 676; Mount Adams, *Suksdorf* 194.

Zonal distribution: Hudsonian?

2. Agrostis thurberiana A. S. Hitchcock, U. S. Dept. Agr. Bur. Pl. Ind. Bull. **68**: 23. 1905.

Type locality: "In wet places on mountains, Skamania County, Wash." Collected by Suksdorf.

Range: British Columbia to California and Utah.

Specimens examined: Mount Adams, *Suksdorf* 24, 194; Nason Creek, *Sandberg & Leiberg* 676; Mount Rainier, *Flett* 1955.

3. **Agrostis depressa** Vasey, Bull. Torr. Club **13**: 54. 1886.
Agrostis exarata stolonifera Vasey, loc. cit.
Type locality: Clear Creek Canyon, Colorado.
Range: Washington to California, Colorado.
Specimens examined: West Klickitat County, *Suksdorf* 40, 140; Ilwaco, *Piper*.
Zonal distribution: Humid Transition.

4. **Agrostis humilis** Vasey, Bull. Torr. Club **10**: 21. 1883.
Type locality: Mount Adams, Washington. Collected by Suksdorf.
Range: British Columbia to Oregon and Colorado.
Specimens examined: Olympic Mountains, *Flett* 836; *Elmer* 1951; Mount Rainier, *Piper* 1976, 1975, 1973, 1974; *Allen* 65a, 179; Skamania County, *Suksdorf* 1021, 1079; Mount Adams, *Suksdorf* 25; *Howell* 85; Stevens Pass, *Sandberg & Leiberg*, August, 1893; Cascade Mountains *Vasey* 362; Bridge Creek, *Elmer* 677.
Zonal distribution: Arctic.

5. **Agrostis alba** L. Sp. Pl. **1**: 63. 1753. Redtop.
Type locality: "Habitat in Europae nemoribus."
Range: British Columbia to Labrador and southward.
Specimens examined: Clallam County, *Elmer* 1954; Southbend, *Spillman*, August 7, 1899; Montesano, *Heller* 4034, 3957; Skamania County, *Flett* 1387; Tacoma, *Piper*, July 15, 1897; Wenache, *Whited* 4; Ellensburg, *Elmer* 407; *Piper* 2578; Tieton River, *Cotton* 493; Parker, *A. D. Dunn*, August 8, 1901; Douglas County, *Spillman*, May 27, 1896; *Sandberg & Leiberg* 403; North Palouse River, *Vasey*, July 3, 1901; Pullman, *Piper*, July, 1894; Wawawai, *Piper* 3531; Ellensburg, *Vasey* 489.
Zonal distribution: Transition.

6. **Agrostis pallens** Trin. Mem. Acad. St. Petersb. IV. **6**^{2}: 328. 1841.
Agrostis exarata littoralis Vasey, Bull. Torr. Club. **13**: 54. 1886.
Type locality: "Amer.-borealis?"
Range: Washington to California along the coast.
Specimens examined: Copalis, *Conard* 416; Westport, *Henderson* 2116.
Zonal distribution: Humid Transition.

6a. **Agrostis pallens foliosa** (Vasey) A. S. Hitchcock, U. S. Dept. Agr. Bur. Pl. Ind. Bull. **68**: 34. 1905.
Agrostis foliosa Vasey, Bull. Torr. Club **13**: 55. 1886.
Agrostis diegoensis Vasey, loc. cit.
Type locality: Oregon. Collected by Howell.
Range: British Columbia to Idaho and California.
Specimens examined: Union City, *Piper* 950, 949; Lakeview, *Henderson* 2125; East Seattle, *Henderson* 2113; Skamania County, *Flett* 1382, 1386; Cascade Mountains, Yakima County, *Henderson*, August 3, 1892; Cape Horn, *Suksdorf* 2332, 2331; Steptoe, *Vasey*, June 1900; Pullman, *Piper* 3106, 1927, 3043; Wawawai, *Piper* 3531.
Zonal distribution: Transition.

All the Washington specimens that have been named *A. hallii* Vasey belong to *A. pallens foliosa*.

7. **Agrostis microphylla** Steud. Syn. Pl. Gram. 164. 1855.
Type locality: "Douglas legit in Am. Sptr." Collected by Douglas in North America.
Range: Washington to California.
Specimens examined: Seattle, *Piper* 828; Lake Crescent, *Lawrence* 306; Stuart Island, *Lawrence* 124; Johns Island, *Lawrence* 190; Falcon Valley, *Suksdorf* 47; Douglas County, *Sandberg & Leiberg* 327; Montesano, *Heller* 4010.
Zonal distribution: Humid Transition.

8. **Agrostis ampla** A. S. Hitchcock, U. S. Dept. Agr. Bur. Pl. Ind. Bull. 68: 38. 1905.

TYPE LOCALITY: "On wet rocks near Rooster Rock, Multnomah County, Oregon."

RANGE: British Columbia to Arizona.

SPECIMENS EXAMINED: Olympic Mountains, *Elmer* 1953; Seattle, *Henderson* 2113; Whatcom Lake, *Suksdorf* 132; Bingen, *Suksdorf* 2829; Falcon Valley *Suksdorf* 132; Skamania County, *Flett* 1389.

ZONAL DISTRIBUTION: Humid Transition.

This species was previously referred to the Mexican *A. virescens* H. B. K.

9. **Agrostis exarata** Trin. Gram. Unifl. 207. 1824.

Agrostis grandis Trin. Mem. Acad. St. Petersb. IV. 6^2: 316. 1841.

Agrostis asperifolia Trin. op. cit. 317.

Agrostis scouleri Trin. op. cit. 329.

Agrostis albicans Buckl. Proc. Acad. Phila. **1862**: 91. 1862.

TYPE LOCALITY: "Ex Unalaschka." Collected by Eschscholtz.

RANGE: Alaska to Mexico.

SPECIMENS EXAMINED: Olympic Mountains, *Elmer* 1952; Clallam County, *Elmer* 1949; Montesano, *Heller* 4018; Point Orchard, *Piper* 2311; Seattle, *Henderson* 2114; Upper Nisqually Valley, *Allen* 45; Wenache Region, *Brandegee* 1163; North Yakima, *Watt*, August, 1895; Yakima River, *Cotton* 425; Cascade Mountains, 49°, *Lyall* in 1859; Southbend, *Spillman*, August 17, 1899; Chelan, *Elmer* 485; Douglas County, *Sandberg & Leiberg* 370; Wilson Creek, *Lake & Hull* 97; Spokane, *Piper* 2852, 2623; Steptoe, *Vasey*, June, 1900; Waitsburg, *Horner* 499; Blue Mountains, Salmon River, *Horner* 496; Pullman, *Piper* 1759, 1923; Cascade Mountains, *Vasey* 149.

ZONAL DISTRIBUTION: Upper Sonoran to Arctic.

10. **Agrostis rossae** Vasey, Contr. Nat. Herb. 3: 76. 1892.

Agrostis varians Trin. Mem. Acad. Petersb. VI. 6^2: 314. 1841, not Thuill. 1790.

Agrostis variabilis Rydberg, Mem. N. Y. Bot. Gard. 1: 32. 1900.

TYPE LOCALITY: Yellowstone Park, Wyoming.

RANGE: British Columbia to Colorado and California.

SPECIMENS EXAMINED: Olympic Mountains, *Elmer* 1948, *Piper* 1994; Nason Creek, *Sandberg & Leiberg* 656; Mount Rainier, *Allen* 179; *Piper* 1978, 1979, 1972, 1980, 1970; Skamania County, *Suksdorf* 1020; Mount Adams, *Henderson* 2127; Atanum River, *Henderson* 2119; Horseshoe Basin, *Elmer* 730; Walla Walla, *Piper* 179a.

ZONAL DISTRIBUTION: Hudsonian and Arctic.

11. **Agrostis hyemalis** (Walt.) B. S. P. Prel. Cat. N. Y. 68. 1888.

Cornucopiae hyemalis Walt. Fl. Car. 73. 1788.

Agrostis scabra Willd. Sp. Pl. 1: 370. 1799.

Agrostis nutkaensis Kunth, Enum. Pl. 1: 222. 1833.

Trichodium album Presl, Rel. Haenk. 1: 244. 1830.

Agrostis laxiflora (Michx.) Richards. Bot. App. Frankl. Journ. 731. 1823.

TYPE LOCALITY: Carolina.

RANGE: Throughout most of North America.

SPECIMENS EXAMINED: Clallam County, *Elmer* 1950; Southbend, *Spillman*, August 17, 1899; Orcas Island, *Henderson* 2112; Snoqualmie Falls, *Piper* 827; Nisqually Valley, *Allen* 43; Tacoma, *Flett* 17; Cascade Mountains, *Henderson*, August, 1892; Tieton River, *Cotton* 435; North Yakima, *Watt* in 1895; Glenwood, *Flett* 1395; Parker, *Dunn*, August 8, 1901; Ophir, *Elmer* 510; Loomis, *Elmer* 557; Thorn Creek, *Vasey*, July 10, 1901; Steptoe, *Vasey*, July, 1900; Spokane, *Henderson* 2111; Pullman, *Piper* 1927; Blue Mountains, *Horner* 505; Cascade Mountains, *Vasey* 382, 68.

ZONAL DISTRIBUTION: Transition.

11a. Agrostis hyemalis geminata (Trin.) A. S. Hitchcock, U. S. Dept. Agr. Bur. Pl. Ind. Bull. **68:** 44. 1905.

Agrostis geminata Trin. Gram. Unifl. 207. 1824.

TYPE LOCALITY: Unalaska.

RANGE: Alaska to Washington and Colorado.

SPECIMENS EXAMINED: Cascade Mountains, *Henderson*, July, 1892; Skagit Pass, *Lake & Hull* 119; Mount Rainier, *Allen* in 1894.

ZONAL DISTRIBUTION: Arctic.

12. Agrostis idahoensis Nash, Bull. Torr. Club. **24:** 42. 1897.

Agrostis tenuis Vasey, Bull. Torr. Club. **10:** 21. 1883, not Sibth. 1794.

Agrostis tenuiculmis Nash, Mem. N. Y. Bot. Gard. **1:** 32. 1900.

TYPE LOCALITY: "Forest, Nes Perces County, Idaho." Collected by Heller.

RANGE: Washington and Montana to California and Colorado.

SPECIMENS EXAMINED: Without locality, *Brandegee* 1165; Wenache Mountains, *Cotton* 1669; without locality, *Suksdorf* in 1883.

ZONAL DISTRIBUTION: Canadian?

13. Agrostis oregonensis Vasey, Bull. Torr. Club. **13:** 55. 1886 (April).

Agrostis attenuata Vasey, Bot. Gaz. **11:** 337. 1886 (December).

TYPE LOCALITY: "Oregon." Collected by Howell.

RANGE: Washington and Oregon.

SPECIMENS EXAMINED: Skamania County, *Suksdorf* 907; Copalis, *Conard* 47; Lake Sutherland, *Lawrence* 318; Kittitas County, *Henderson* 2123.

ZONAL DISTRIBUTION: Humid Transition.

14. Agrostis schiediana Trin. Mem. Acad. St. Petersb. VI. 6^2: 327. 1841.

Agrostis hallii californica Vasey, Contr. Nat. Herb. **3:** 74. 1892.

TYPE LOCALITY: "Mexico."

RANGE: British Columbia to Mexico.

SPECIMENS EXAMINED: Falcon Valley, *Suksdorf* 50, 189, 196; Lewis River, *Henderson* 2131.

On Suksdorf's List appear the names *Agrostis canina* L., *A. densiflora* Vasey var. (*arenaria*), *A. verticillata* Vill. (*A stolonifera* L.), and *A. perennans* Tuck.? These names all seem to rest upon erroneous determinations, the last being *A. hyemalis*. *A. verticillata* Vill. has been collected at Walla Walla by Leckenby, but only from cultivated plots.

HOLCUS.

1. Holcus lanatus L. Sp. Pl. **2:** 1048. 1753. VELVET GRASS.

TYPE LOCALITY: "Habitat in Europae pascuis arenosis."

SPECIMENS EXAMINED: Seattle, *Smith* 785; near Montesano, *Heller* 3952; Clarks Springs, Spokane County, *Kreager* 86.

Quite commonly escaped from cultivation. In western Washington known as "mesquite grass."

ARRHENATHERUM.

1. Arrhenatherum elatius (L.) Beauv.; Mert. & Koch, Deutsch. Fl. **1:** 546. 1823. TALL MEADOW OATGRASS.

Avena elatior L. Sp. Pl. **1:** 79. 1753.

Holcus avenaceus Scop. Fl. Carn. ed. 2. 276. 1772.

Arrhenatherum avenaceum Boiss. Voy. Bot. Espagne **2:** 657. 1839-45.

TYPE LOCALITY: "Habitat in Europae maritimis & apricis."

SPECIMENS EXAMINED: Seattle, *Piper* 830.

AIRA. HAIR GRASS.

Panicle loose; lemma 2 mm. long.................................. 1. *A. caryophyllea*.
Panicle dense; lemma 3 mm. long.................................. 2. *A. praecox*.

1. **Aira caryophyllea** L. Sp. Pl. 1:66. 1753.

TYPE LOCALITY: "Habitat in Angliae, Germaniae, Galliae, glareosis."

SPECIMENS EXAMINED: Coupeville, *Gardner* 346; Clallam County, *Elmer* 1933; Seattle, *Piper* 823; Lake Park, *Piper*, July 27, 1895; Montesano, *Heller* 3889; Pierce and Thurston counties, *Henderson* 2142.

2. **Aira praecox** L. Sp. Pl. 1: 65. 1753.

TYPE LOCALITY: Europe.

SPECIMENS EXAMINED: Olympic Mountains, *Elmer* 1932; Point Orchard, *Piper* 2310, 832; Whidby Island, *Gardner* 345; Stuart Island, *Lawrence* 59.

MERATHREPTA.

[MERATHREPTA Raf. in Seringe, Bull. Bot. 1: 221. 1830.]

The type of Danthonia DC. is *Festuca decumbens* L. (*Triodia decumbens* R. Br.), and the name can not therefore be used in the current sense. Merathrepta has for its type *M. spicata* (L.) Raf. (*Avena spicata* L.).

- Spikelets ascending, in a close panicle.
  - Callus very short, not hairy.. 1. *M. pinetorum.*
  - Callus elongate, densely hairy.................................... 2. *M. intermedia.*
- Spikelets spreading in a loose panicle or solitary.
  - Sheaths smooth.. 3. *M. californica*
  - Sheaths hairy.
    - Lemma abruptly narrowed; spikelets usually 2 to 4.......... 4. *M. americana.*
    - Lemma not abruptly narrowed; spikelets usually solitary..... 5. *M. unispicata.*

1. **Merathrepta pinetorum.**

Danthonia spicata pinetorum Piper, Erythea 7: 103. 1899.

Danthonia thermale Scribner, U. S. Dept. Agr. Div. Agrost. Circ. 30: 5. 1901.

TYPE LOCALITY: "In gravelly soil, Mason County, Wash., 3 miles south of Union City." Collected by Piper.

RANGE: British Columbia, Washington, and Idaho.

SPECIMENS EXAMINED: Mason County, near Union City, *Piper* 943; between mouth of Spokane River and Colville, *Wilkes Expedition*.

ZONAL DISTRIBUTION: Transition.

2. **Merathrepta intermedia** (Vasey).

Danthonia intermedia Vasey, Bull. Torr. Club 10: 52. 1883.

TYPE LOCALITY: "California, Rocky Mountains, Plains of Br. America to Mount Albert, Lower Canada."

RANGE: Canada to Washington, Colorado, and California.

SPECIMENS EXAMINED: Loomis, *Elmer* 553; Stevens Pass, *Sandberg & Leiberg*, August, 1893; Mount Rainier, *Piper* 1950; Cascade Mountains, *Vasey* 442.

ZONAL DISTRIBUTION: Arctic.

2a. **Merathrepta intermedia cusickii** (Williams).

Danthonia intermedia cusickii Williams, U. S. Dept. Agr. Div. Agrost. Circ. 30: 7. 1901.

TYPE LOCALITY: "Oregon."

RANGE: Washington to Montana and Oregon.

SPECIMENS EXAMINED: Olympic Mountains, *Piper* 1987.

ZONAL DISTRIBUTION: Arctic.

3. **Merathrepta californica** (Boland.).

Danthonia californica Boland. Proc. Cal. Acad. 2: 182. 1858–62.

TYPE LOCALITY: "On the borders of cultivated fields near the bay at Oakland; hills near Mission Dolores, San Francisco."

RANGE: California to Washington and Montana.

SPECIMENS EXAMINED: Pullman, *Elmer* 1011; *Piper* 1744; *Horner* 879; Steptoe, *Vasey*, June, 1900; without locality, *Sandberg & Leiberg* 488.

The following specimens are doubtfully referred here: Coupeville, *Gardner* 342; Seattle, *Smith* 829; Kitsap County, *Piper* 821.

ZONAL DISTRIBUTION: Transition.

4. **Merathrepta americana** (Scribn.).

Danthonia americana Scribn. U. S. Dept. Agr. Div. Agrost. Circ. **30**: 5. 1901.

Danthonia grandiflora Philippi, Anal. Univ. Chil. **568**. 1873, not Hochst. 1851.

TYPE LOCALITY: Chile.

RANGE: British Columbia to California. Chile.

SPECIMENS EXAMINED: Montesano, *Heller* 3908; Falcon Valley, *Suksdorf* 150.

ZONAL DISTRIBUTION: Transition.

5. **Merathrepta unispicata** (Thurb.).

Danthonia unispicata Thurb. in S. Wats. Bot. Cal. **2**: 294. 1880.

TYPE LOCALITY: "From San Diego to San Francisco," California.

RANGE: Washington to California.

SPECIMENS EXAMINED: Spokane, *Piper* 2599; without locality, *Geyer* 189; Pullman, *Elmer* 1327; *Brodie*, June, 1898.

ZONAL DISTRIBUTION: Arid Transition.

AVENA.

1. **Avena fatua glabrata** Petermann, Flora des Bienitz 13. 1841. SMOOTH WILD OAT.

Avena fatua glabrescens Coss. Fl. Alg. 113. 1864–67.

TYPE LOCALITY: Not determined.

RANGE: Introduced on the Pacific coast, especially in Washington, Oregon, and Idaho.

SPECIMENS EXAMINED: Tacoma, *Piper*, July 5, 1897; Pullman, *Piper*, July 2, 1894.

DESCHAMPSIA.

Lower glume 1-nerved.
  Glumes not longer than the florets.............................. 1. *D. cespitosa.*
  Glumes longer than the florets.................................. 2. *D. atropurpurea.*
Lower glume 3-nerved.
  Annual; glumes 5 to 7 mm. long................................ 3. *D. calycina.*
  Perennial; glumes 3 to 4 mm. long.............................. 4. *D. elongata.*

1. **Deschampsia cespitosa** (L.) Beauv. Agrost. 91, 160. 1812.

Aira cespitosa L. Sp. Pl. **1**: 64. 1753.

TYPE LOCALITY: Europe.

RANGE: Alaska to Labrador south to California, Arizona, Illinois, and New Jersey. Europe, Asia.

SPECIMENS EXAMINED: Olympic Mountains, *Elmer* 1665; Sumas Prairie, *Lyall* in 1858–9; Seattle, *Smith* 858; Gray's Harbor, *Henderson*, June, 1892; Fort Vancouver, *Garry* in 1826; Railroad Creek, *Elmer* 718; Wenache River, *Whited*; Spokane, *Piper*, September, 1896; Pullman, *Piper* 1749; Steptoe, *Vasey* 12; Pend Oreille River, *Lyall* in 1861; Waitsburg, *Horner* 509; Lake Kalispel, *Kreager* 328; Lake Chelan, *Vasey* 24; without locality, *Vasey* 367.

ZONAL DISTRIBUTION: Transition.

2. **Deschampsia atropurpurea** (Wahl.) Scheele, Flora **27**: 56. 1844.

Aira atropurpurea Wahl. Fl. Lapp. 37. 1812.

Aira latifolia Hook. Fl. Bor. Am. **2**: 243. 1840.

Deschampsia atropurpurea latifolia Scribn. in Macoun, Cat. Can. Pl. **2**: 209. 1888.

TYPE LOCALITY: Finmark.

RANGE: Mountains of New England and New York to Alaska south to Oregon and Colorado. Europe.

SPECIMENS EXAMINED: Olympic Mountains, *Elmer* 1670; Mount Rainier, *Piper* 1949; Mount Rainier, *Smith* 690; Mount Adams, *Henderson* 2147; Stevens Pass, *Sandberg & Leiberg*, August, 1893; Wenache Region, *Brandegee*, 1176; North Fork of Bridge Creek, *Elmer* 735; Mount Stuart, *Elmer* 1151; Skamania County, *Flett* 1371; Cascade Mountains, *Vasey* 423.

ZONAL DISTRIBUTION: Hudsonian.

3. **Deschampsia calycina** Presl, Rel. Haenk. **1**: 251. 1830.

Aira danthonioides Trin. Mem. Acad. St. Petersb. VI. **1**: 57. 1830.

TYPE LOCALITY: "Hab. ad Monte-Rey Californiae."

RANGE: Washington and Idaho to California and Arizona. Peru.

SPECIMENS EXAMINED: Douglas County, *Spillman*, May, 1896; *Sandberg & Leiberg* 292; Wilson Creek, *Sandberg & Leiberg* 395; Clealum, *Henderson*, June, 1892; Spipen [Naches] River, *Wilkes Expedition;* Klickitat River, *Flett* 1369; Pullman, *Piper* 1922, 1758; *Elmer* 888; Steptoe, *Vasey* 25; Rattlesnake Mountains, *Cotton* 413; Walla Walla, *Brandegee* 1175; Blue Mountains, *Horner* 491; Kittitas County, *Vasey* 92; Palouse City, *F. D. Cloud*, June 22, 1895.

ZONAL DISTRIBUTION: Arid Transition.

4. **Deschampsia elongata** (Hook.) Munro in Benth. Pl. Hartw. 342. 1857.

Aira elongata Hook. Fl. Bor. Am. **2**: 243. 1840.

TYPE LOCALITY: "Sandy islands of the River Columbia." Collected by Douglas.

RANGE: British Columbia to Montana and California.

SPECIMENS EXAMINED: Olympic Mountains, *Elmer* 1664; San Juan Island, *Lyall* in 1858; Mason County, *Kincaid*, June, 1893; Montesano, *Heller* 4044, 3953a; Nisqually Valley, *Allen* 38; Seattle, *Piper* 843; Okanogan County, *Sandberg & Leiberg* 582; North Yakima, *G. H. Watt;* Wenache, *Whited* 1302; Stehekin, *Whited* 1399; Roslyn, *Whited* 477; Skamania County *Flett* 1372; Pullman, *Piper* 1741; Walla Walla, *Brandegee* 1174; Blue Mountains, *Lake & Hull* 70; Mount Carlton, *Kreager* 199; Tieton River, *Cotton* 50; Ellensburg, *Vasey* 389.

ZONAL DISTRIBUTION: Transition.

TRISETUM.

Lemmas awnless; panicle narrow.................................... 1. *T. muticum.*
Lemmas awned.
  Panicle dense and spike-like.. 2. *T. spicatum.*
  Panicle loose and open.
    Sheaths pubescent, lemma 7 mm. long........................ 3. *T. canescens.*
    Sheaths glabrous; lemma 5 mm. long.......................... 4. *T. cernuum.*

1. **Trisetum muticum** Scribn. U. S. Dept. Agr. Div. Agrost. **11**: 50. 1898.

Trisetum subspicatum muticum Boland.; S. Wats. Bot. Cal. **2**: 296. 1880.

Trisetum brandegei Scribner, Bull. Torr. Club **10**: 64. 1883.

TYPE LOCALITY: "On the upper Tuolumne," California. Collected by Bolander.

RANGE: California to Washington, east to Colorado.

SPECIMENS EXAMINED: Spangle, *Suksdorf* 949.

ZONAL DISTRIBUTION: Arid Transition.

2. **Trisetum spicatum** (L.) Richter, Pl. Eur. **1**: 59. 1890.

Aria spicata L. Sp. Pl. **1**: 64. 1753.

Aria subspicata L. Syst. Veg. ed. **10**: 873. 1759.

Trisetum subspicatum Beauv. Agrost. 88 and 180. 1812.

TYPE LOCALITY: "Habitat in Lapponiae alpibus."

RANGE: Alaska to Labrador, south to California, New Mexico, and North Carolina.

SPECIMENS EXAMINED: Olympic Mountains, *Elmer* 1947; Cascade Mountains, 49°, *Lyall* in 1860; Mount Rainier, *Piper* 2620, 1951; Mount Adams, *Howell* 423; *Flett* 1414; Yakima County, *Henderson* 2261, 2262; Loomis, *Elmer* 556; Klickitat River, *Flett* 1368; Blue Mountains, *Piper*, July, 1896; without locality, *Sandberg & Leiberg* 687.

ZONAL DISTRIBUTION: Arctic.

2a. **Trisetum spicatum molle** (Michx.).

Avena mollis Michx. Fl. Bor. Am. 1: 72. 1803.

Trisetum subspicatum molle Gray, Man. ed. 2. 572. 1856.

TYPE LOCALITY: "Hab. in Canada."

RANGE: Alaska to New England and Oregon.

SPECIMENS EXAMINED: Loomis, *Elmer* 633; Cascade Mountains, *Vasey* 386.

ZONAL DISTRIBUTION: Arctic.

3. **Trisetum canescens** Buckl. Proc. Acad. Phila. **1862**: 100. 1862.

TYPE LOCALITY: "Oregon, Columbia Plains." Collected by Nuttall.

RANGE: British Columbia to Idaho and California.

SPECIMENS EXAMINED: Clallam County, *Elmer* 1944, 1945; Seattle, *Piper*, June, 1891; *Smith* 1097; Olympia, *Henderson*, June, 1892; Montesano, *Heller* 3931; upper Nisqually Valley, *Allen* 48; Mount Stuart, *Elmer* 1143; Kamiak Butte, *Piper*, July 20, 1899; Palouse, *F. D. Cloud*, June, 1895; Blue Mountains, *Horner* 502, 518; Cascade Mountains, *Vasey* 483; Stehekin, *Griffiths & Cotton* 238.

ZONAL DISTRIBUTION: Transition.

5. **Trisetum cernuum** Trin. Mem. Acad. St. Petersb. 1: 61. 1830 (January).

Avena nutkaensis Presl, Rel. Haenk. 1: 254. 1830.

Trisetum sandbergii Beal, Grasses N. Am. 2: 378. 1896.

Trisetum nutkaense Scribner & Merrill, Univ. Cal. Bot. Publ. 1: 63. 1902.

TYPE LOCALITY: "Ex Ins. Sitka."

RANGE: Alaska to California and Idaho.

SPECIMENS EXAMINED: Olympic Mountains, *Elmer* 1946; Mount Rainier, *Smith* 979; Longmire Springs, *Smith*, August, 1890; upper Nisqually Valley, *Allen* 42; Seattle, *Piper*, *Smith* 846; Wenache Region, *Brandegee* 1177; Pullman, *Piper*, July 13, 1899; Klickitat River, *Flett* 1368, 1412; Blue Mountains, *Lake & Hull* 64; Mount Stuart, *Sandberg & Leiberg* 823.

ZONAL DISTRIBUTION: Humid Transition.

PHRAGMITES.

1. **Phragmites phragmites** (L.) Karst. Deutsch. Fl. 379. 1880–83. REED.

Arundo phragmites L. Sp. Pl. 1: 81. 1753.

Phragmites communis Trin. Fund. Agrost. 134. 1820.

TYPE LOCALITY: "Habitat in Europae lacubus, fluviis."

RANGE: British Columbia to Quebec south to Georgia and California, Europe, Asia.

SPECIMENS EXAMINED: Ophir, *Elmer* 519; Columbia River, *Scouler;* Crab Creek, Douglas County, *Lake & Hull* 113; between Yakima and Ellensburg, *Piper*.

ZONAL DISTRIBUTION: Arid Transition.

EATONIA.

Panicle dense, erect; upper glume obovate.......................... 1. *E. obtusata*.
Panicle lax, often drooping; upper glume oblanceolate............. 2. *E. pennsylvanica*.

1. **Eatonia obtusata** (Michx.) Gray, Man. ed. 2. 558. 1856.

Aira obtusata Michx. Fl. 1: 62. 1803.

TYPE LOCALITY: "Hab. in aridis, a Carolina ad Floridam."

RANGE: Washington to Ontario and Massachusetts, southward to Arizona and Florida.

SPECIMENS EXAMINED: Wilson Creek, *Lake & Hull*, August, 1892; Wawawai, *Elmer* 1024; *Brodie*, June, 1898; Parker, *A. D. Dunn*; Priest Rapids, *Cotton* 1389; Prosser, *Cotton* 733.

ZONAL DISTRIBUTION: Upper Sonoran.

2. Eatonia pennsylvanica (DC.) Gray, Man. ed. 2. 558. 1856.

Koeleria pennsylvanica DC. Cat. Hort. Monsp. 117. 1813.

TYPE LOCALITY: "Penn."

RANGE: New Brunswick to British Columbia, south to Georgia and Texas.

SPECIMENS EXAMINED: Blue Mountains, *Lake & Hull* 61; Steptoe, *Vasey* 63; Usk, *Kreager* 358; Toppenish, *Cotton* 802.

ZONAL DISTRIBUTION: Arid Transition.

KOELERIA.

1. Koeleria cristata (L.) Pers. Syn. **1**: 97. 1805.

Aira cristata L. Sp. Pl. **1**: 63. 1753.

TYPE LOCALITY: "Habitat in Angliae, Galliae, Helvetiae siccioribus."

RANGE: British Columbia to Athabasca, southward to Arizona, Kansas, and Pennsylvania.

SPECIMENS EXAMINED: Olympic Mountains, *Elmer* 1668; Alki Point, *Piper*, June, 1891; Fidalgo Island, *Lyall* in 1858; Nisqually, *Wilkes Expedition;* Ophir, *Elmer* 513; Fort Okanogan, *Wilkes Expedition;* Wenache, *Whited* 1131; Douglas County, *Spillman*, May, 1896; Toppenish, *Henderson* 2210; Tieton River, *Cotton* 452; Rattlesnake Mountains, *Cotton* 411; Klickitat River, *Flett* 1411; west Klickitat County, *Suksdorf* 1110 (a very pubescent form); Spokane, *Piper* 2723; Spokane, *Kreager* 1 (very pubescent); Clarks Springs, *Kreager* 70; Pullman, *Piper* 1757; *Elmer* 885; Steptoe, *Vasey*, June, 1900; Walla Walla, *Leckenby*, May, 1898; Blue Mountains, *Horner* 492; Kittitas County, *Vasey* 143; Palouse City, *F. D. Cloud*, June 22, 1895.

ZONAL DISTRIBUTION: Transition.

This species is very variable and a critical revision of the genus may show it to consist of several subspecies. The European forms have been much subdivided in a recent paper by Domin. To several of his segregates he refers American specimens.

ERAGROSTIS.

Stems creeping; spikelets 10 to 35-flowered .... 1. *E. hypnoides.*
Stems erect; spikelets 7 to 10-flowered................................ 2. *E. lutescens.*

1. Eragrostis hypnoides (Lam.) B. S. P. Prel. Cat. N. Y. 69. 1888.

Poa hypnoides Lam. Tabl. Encyc. **1**: 185. 1791.

Eragrostis reptans Nees, Agrost. Bras. 514. 1829.

TYPE LOCALITY: "Ex America merid."

RANGE: New England to Washington, south to Florida, Texas, and California.

SPECIMENS EXAMINED: Kalama, *Piper*, October, 1901; Almota, *Piper* 1799; Vancouver, *Sheldon* 11266; Toppenish, *Cotton* 794.

ZONAL DISTRIBUTION: Humid Transition and Upper Sonoran.

2. Eragrostis lutescens Scribner, U. S. Dept. Agr. Div. Agrost. Circ. **9**: 7. 1899.

TYPE LOCALITY: "Sandy banks of Snake River, Almota, Washington."

RANGE: Washington and Idaho.

SPECIMENS EXAMINED: Near Kennewick, *Elmer* in 1897; Almota, *Piper* 2624.

ZONAL DISTRIBUTION: Upper Sonoran.

MELICA.

Lemmas notched at apex, usually awned.
  Awns long.
    Nerves of the lemma hirsute.................................... 1. *M. smithii.*
    Nerves of the lemma glabrous.................................. 2. *M. aristata.*
  Awns short or none.. 3. *M. harfordii.*
Lemma not notched at apex, awnless.
  Apex of lemma long-acuminate.................................... 4. *M. subulata.*
  Apex of lemma obtuse.
    Not bulbiferous; spikelets 12 to 16 mm. long................. 5. *M. stricta.*
    Bulbiferous; spikelets much shorter.
      Spikelets shining, slender-peduncled, often nodding; plants not tufted.................................. 6. *M. spectabilis.*
      Spikelets dull, erect or ascending; plants tufted.
        Panicle strict; glumes membranous.................... 7. *M. bella.*
        Panicle usually spreading; glumes coriaceous......... 8. *M. fugax.*

1. **Melica smithii** (Porter) Vasey, Bull. Torr. Club **15**: 294. 1888.
Avena smithii Porter; Gray, Man. ed. 3. 640. 1867.
Melica retrofracta Suksdorf, Deutsch. Bot. Monatss. **19**: 92. 1901.
Type locality: "Isle Royale, Keewenaw Point, Lake Superior."
Range: Lake Superior to Washington and Oregon.
Specimens examined: Sumas Prairie, *Lyall* in 1858; without locality, *Sandberg & Leiberg* 504; Skamania County, *Suksdorf* 2334; Blue Mountains, *Lake & Hull* 117.
Zonal distribution: Canadian?

2. **Melica aristata** Thurb.; Boland. Proc. Cal. Acad. **4**: 103. 1870.
Type locality: "Loose soil in open woods near Clark's, 4,000 feet altitude, 1866." California.
Range: California to Washington.
Specimens examined: Klickitat County, *Suksdorf* 73; Wenas, *Griffiths & Cotton* 93a.
Zonal distribution: Transition.

3. **Melica harfordii** Boland. Proc. Cal. Acad. **4**: 102. 1870.
Type locality: "Wooded hillsides, Santa Cruz road, near Lexington [California], June, 1865."
Range: California to Washington.
Specimens examined: Clallam County, *Elmer* 1936, 1938; Cascade Mountains, *Vasey* 6; west Klickitat County, *Suksdorf* 3, 288, 17; Lower Cascades, Skamania County, *Suksdorf* 1188.
Zonal distribution: Humid Transition.

3a. **Melica harfordii tenuior** nom. nov.
Melica harfordii minor Vasey, Bull. Torr. Club. **15**: 48. 1888, not *M. minor* Hack. 1881.
Type locality: Siskiyou Mountains, Oregon. Collected by Howell.
Range: Washington and Oregon.
Specimens examined: Without locality, *Vasey* in 1889.

4. **Melica spectabilis** Scribner, Proc. Acad. Phila. **1885**: 45. 1885.
Melica scabrata Scribner; Piper & Beattie, Fl. Palouse Reg. 25. 1901.
Range: Eastern Washington and Oregon to Montana.
Specimens examined: Spokane County, *Suksdorf* 1113; Pullman, *Piper* 1745; *Elmer* 833; Mount Rainier Forest Reserve, *Flett* in 1899.
Zonal distribution: Arid Transition.

5. **Melica subulata** (Griseb.) Scribner, Proc. Acad. Phila. **1885**: 47. 1885.
Bromus subulatus Griseb. in Ledeb. Fl. Ross. **4**: 358. 1853.

Melica acuminata Boland. Proc. Cal. Acad. **4**: 104. 1870.
Festuca cepacea Philippi, Linnaea **33**: 297. 1864–65.
Melica cepacea Scribner, U. S. Dept. Agr. Div. Agrost. Circ. **30**: 8. 1901.
Type locality: Unalaska.
Range: Northern California to Wyoming and Alaska.
Specimens examined: Clallam County, *Elmer* 1937; Seattle, *Piper* 839, 864; Coupeville *Gardner* 339; Easton, *Henderson* 2216; upper Nisqually Valley, *Allen* 47; Blue Mountains, *Piper* 2560; *Lake & Hull* 83; *Horner* 512; Stehekin, *Griffiths & Cotton* 220.
Zonal distribution: Transition to Arctic.

6. Melica bella Piper, U. S. Dept. Agr. Div. Agrost. Circ. **27**: 10. 1900.
Melica bulbosa Geyer; Hook. Journ. Bot. & Kew Misc. **8**: 19. 1856, nom. nud., not *Melica bulbosa* Geyer; Thurb. in S. Wats. Bot. Cal. **2**: 304. 1880.
Type locality: "Rocky ravine, Upper Platte." Collected by Geyer.
Range: Washington to Wyoming and Oregon.
Specimens examined: Wenache Mountains, *Brandegee* 1182; *Whited*, May 31, 1899; Mount Stuart, *Sandberg & Leiberg* 580; Upper Atanum River, *Henderson* 2214; Peshastin, *Sandberg & Leiberg*, July, 1893; Wenache, *G. R. Vasey*, July, 1889; Ellensburg, *Piper* 2616; Chelan, *Griffiths & Cotton* 167; Stehekin, *Griffiths & Cotton* 239.
Zonal distribution: Arid Transition.

7. Melica bella intonsa, subsp. nov.
Leaves and culms covered with a dense short reflexed pubescence.
Range: Washington to Nevada.
Specimens examined: Wenas, *Griffiths & Cotton* 103, June, 1902 (type).

7a. Melica fugax madophylla, subsp. nov.
Leaves and stems glabrous or nearly so.
Range: Washington to California.
Specimens examined: Falcon Valley, *Suksdorf* 61 (type), 78, 16, 5; without locality *Wilkes Expedition*; Cascade Mountains, *Vasey* 9, 93.

Melica bromoides Gray is included in Suksdorf's List, but there is no evidence that the species occurs in Washington.

PLEUROPOGON.

1. Pleuropogon refractum (A. Gray) Vasey, U. S. Dept. Agr. Div. Bot. Bull. **13**^{2}: *pl. 69.* 1893.
Lophochlaena refracta A. Gray, Proc. Am. Acad. **8**: 409. 1872.
Type locality: Oregon. Collected by Hall.
Range: Oregon and Washington west of the Cascades.
Specimens examined: Olympic Mountains, *Elmer* 1931; *Piper;* Seattle, *Piper* 886; Nisqually Valley, *Allen* 40; Stevens Pass, *Sandberg & Leiberg* 734; White River, *Vasey* 360.
Zonal distribution: Humid Transition to Canadian.

DACTYLIS.

1. Dactylis glomerata L. Sp. Pl. **1**: 71. 1753. Orchard grass.
Type locality: "Habitat in Europae cultis ruderatis."
Specimens examined: Waitsburg, *Horner* 224.

POA. Bluegrass.

Annual; lemma without cobwebby hairs at base...................... **1. *P. annua*.**
Perennial.
Plants with creeping rootstocks.
Stem flattened, 2-edged; panicles small...................... **2. *P. compressa*.**
Stem cylindric.
Lemma webbed, that is, with a tuft of long hairs at the base.

Dioecious, seashore plant; spikelets 10 to 15 mm. long.................................... 3. *P. macrantha.*

Perfect; spikelets 4 to 5 mm. long................. 4. *P. pratensis.*

Lemma not webbed.

Low seashore plant with narrow involute leaves and small panicle................................. 5. *P. confinis.*

Taller grasses, not maritime, with flat or folded leaves.

Florets loose; ligule very short, ciliate; lateral nerves of lemma prominent........... 6. *P. nervosa.*

Florets close; ligule rather long, not ciliate; lateral nerves of lemma not prominent..... 7. *P. olneyae.*

Plants tufted, without rootstocks.

Lateral nerves of lemmas prominent; web present......... 8. *P. trivialis.*

Lateral nerves of lemmas not prominent.

Web present at base of lemma.

Leaves flat or folded, not soft and flaccid.

Panicle short, pyramidal; spikelets 6 to 7 mm. long; low alpine plant..................... 9. *P. arctica.*

Panicle ample, spreading; spikelets 3 to 4 mm. long.. 10. *P. triflora.*

Leaves flat, rather short, soft and flaccid.

Panicle lax, spreading; spikelets 5 to 6 mm. long; florets not early deciduous........... 11. *P. leptocoma.*

Panicle narrow, the rays usually erect; florets early deciduous.

Lemma glabrous, or nearly so........... 12. *P. bolanderi.*

Lemma pubescent...................... 13. *P. howellii.*

Web absent, no tuft of hairs at base of lemma.

Nerves of the lemma pilose below.

Alpine plant; leaf blades flat, green, broad.... 14. *P. alpina.*

Maritime plant; leaf blades narrow or folded, glaucescent............................... 15. *P. pachypholis.*

Nerves of lemma not pilose.

Stems coarse, 60 to 100 cm. high.

Leaves flat, rarely involute, green or rarely glaucescent; panicles ample.

Ligules long.

Panicle compact, lemmas scabrous........................ 16. *P. canbyi.*

Panicle looser; lemmas pubescent......................... 17. *P. leckenbyi.*

Ligules short; panicle loose........ 18. *P. ampla.*

Leaves narrow, involute, pale; panicles narrow, erect.

Ligules short....................... 19. *P. brachyglossa.*

Ligules long........................ 20. *P. nevadensis.*

Stems not coarse nor tall, usually under 60 cm. in height.

Leaves very narrow, filiform and involute.

Panicles loose.

Florets distant; ligule short.... 28. *P. idahoensis.*

Florets close; ligule long....... 29. *P. capillarifolia.*

- Panicles close.
  - Lemmas scabrous; leaves very scabrous.................... 30. *P. cottoni.*
  - Lemmas smooth; leaves smooth. 31. *P. cusickii.*
- Leaves not filiform.
  - Stems low, 5 to 20 cm. high; grasses of the highest mountains.
    - Leaves soft; panicle purple, very short; plants 5 to 10 cm. high. 32. *P. lettermani.*
    - Leaves rather rigid; panicle pale, narrow, elongated; plant 10 to 20 cm. high.................. 33. *P. suksdorfii.*
  - Stems taller, usually 20 to 40 cm. high; mostly grasses of rupestrine habitat.
    - Panicle close, erect; leaves flat.
      - Lemmas pubescent at base; leaves rather narrow, sometimes folded............. 21. *P. sandbergii.* – bus
      - Lemmas glabrous; leaf blades broader.
        - Leaf blades soft....... 22. *P. paddensis.*
        - Leaf blades firm, very short................ 23. *P. curtifolia.*
    - Panicles loose; leaves narrow, flat or involute.
      - Ligules of the sterile shoots obsolete; of the culm leaves short and truncate...... 24. *P. multnomae.*
      - Ligules well developed on all the leaves.
        - Low plants 5 to 10 cm. high; panicle small, with divaricate rays and few spikelets.... 25. *P. vaseyochloa.*
        - Taller; 10 to 30 cm. high; panicle less spreading, with many spikelets.
          - Panicle loose; glumes thin, blades involute.. 26. *P. gracillima.*
          - Panicle close; glumes firm, blades flat...... 27. *P. saxatilis.*

1. **Poa annua** L. Sp. Pl. 1: 68. 1753.

TYPE LOCALITY: "Habitat in Europa ad vias."

SPECIMENS EXAMINED: Near Ellensburg, *Piper* 2617; *Vasey* 181; North Yakima, *Watt*, August, 1895; Southbend, *Spillman*, August 17, 1899; Steptoe, *Vasey* 1; Pullman, *Piper* 2769.

Abundantly introduced, but in some localities apparently native.

2. **Poa compressa** L. Sp. Pl. 1: 69. 1753. CANADA BLUEGRASS.

TYPE LOCALITY: "Habitat in Europae et Americae septentrionalis siccis, muris, tectis."

Specimens examined: Fairhaven, *Piper* 2605; Ellensburg, *Piper* 2618; Steptoe, *Vasey* 50; Colfax, *Vasey* 60.

3. **Poa macrantha** Vasey, Bull. Torr. Club **15**: 11. 1888.

Type locality: "At the mouth of the Columbia River." Collected by Howell.

Range: Seacoast of Oregon and Washington.

Specimens examined: Coupeville, *Gardner* 335; Clallam County, *Elmer* 1923; Westport, *Henderson* 2243; *Heller* 3944.

Zonal distribution: Humid Transition.

4. **Poa pratensis** L. Sp. Pl. 1: 67. 1753. Kentucky bluegrass.

Type locality: "Habitat in Europae pratis fertilissimis."

Specimens examined: Clallam County, *Elmer* 1922, 1920; near Montesano, *Heller* 3866; White River, *Vasey* 125; Cascade Mountains, *Vasey* 124; Sunnyside, *Cotton* 375; Spokane, *Sandberg & Leiberg*, May, 1893; Steptoe, *Vasey* 21; Colfax, *Vasey*, June 20, 1900; Pullman, *Piper*, June, 1893.

5. **Poa confinis** Vasey, U. S. Dept. Agr. Div. Bot. Bull. **13**^{2}: *pl. 75.* 1893.

Poa abbreviata R. Br. err. det. Thurb. in Wats. Bot. Cal. **2**: 312. 1880.

Type locality: Tillamook Bay, Oregon, according to label on type specimen. Collected by Howell.

Range: Alaska to Oregon.

Specimens examined: Westport, *Henderson* 2245; Port Angeles, *Piper* 2308; Clallam County, *Elmer* 1921; Port Discovery, *Wilkes Expedition;* Port Orchard, *Piper;* Johns Island, *Lawrence* 200; Ilwaco, *Piper.*

Zonal distribution: Humid Transition.

6. **Poa nervosa** (Hook.) Vasey, U. S. Dept. Agr. Div. Bot. Bull. **13**^{2}: *pl. 81.* 1893.

Festuca nervosa Hook. Fl. Bor. Am. **2**: 251. 1840.

Type locality: "Nutka Sound." Collected by Scouler.

Range: British Columbia to Oregon.

Specimens examined: Cape Horn, *Piper* 4901.

Zonal distribution: Humid Transition.

7. **Poa olneyae** Piper, Erythea **7**: 101. 1899.

Type locality: Spokane, Washington.

Range: British Columbia to Oregon and Idaho.

Specimens examined: Klickitat River, *Flett* 1358; Falcon Valley, *Suksdorf* 10; Mount Adams, *Suksdorf* 160; Cleveland, *Suksdorf* 109; Simcoe Mountains, *Howell* 9; Mount Stuart, *Elmer* 1159; Atanum River, *Henderson* 2226; Upper Naches River, *Henderson* 2235; Spokane, *Sandberg & Leiberg*, May, 1893; *Piper* 2295, 2820; Wenache Mountains, *Elmer* 467, 468, 444; *Whited* 672; *Cotton* 1262, 1627, 1658.

Zonal distribution: Arid Transition.

This species is near *P. wheeleri* Vasey and our plant has been referred to that species.

8. **Poa trivialis** L. Sp. Pl. 1: 67. 1753. Rough meadow grass.

Type locality: "Habitat in Europae pascuis."

Specimens examined: Tacoma, *Piper*, July 5, 1897; Puyallup, *Piper* 3927, 3928.

9. **Poa arctica** R. Br. Suppl. to App. Parry's Voy. 288. 1824.

Type locality: Melville Island.

Range: Alaska to Labrador, south to Washington and Colorado.

Specimens examined: Mount Rainier, *Allen* 46; *Piper* 1966.

Both these collections were distributed as *Poa laxa* Haenke.

Zonal distribution: Arctic.

10. **Poa triflora** Gilib. Exerc. Phyt. **2**: 531. 1792.

Poa serotina Ehrh. Beitr. **6**: 83. 1791, nom. nud.

Type locality: Europe.

Range: British Columbia to Nova Scotia, southward to Oregon, Nebraska, and New Jersey.

Specimens examined: Fairhaven, *Piper* 2810, 2604; Montesano, *Heller* 4016; Cascade Mountains, 49°, *Lyall* in 1859; Seattle, *Piper* 1452; Ophir, *Elmer* 517; Spokane, *Piper*, August 7, 1898; Clarks Springs, *Kreager* 52; Usk, *Kreager* 362; Steptoe, *Vasey* 61.

Zonal distribution: Transition.

11. Poa leptocoma Trin. Mem. Acad. St. Petersb. VI. **1**: 374. 1830.

Type locality: Sitka.

Range: Alaska to Washington. Siberia.

Specimens examined: Olympic Mountains, *Flett* 835; Mount Stuart, *Sandberg & Lieberg* 806; Klickitat River, *Cotton* 1451; Mount Adams, *Suksdorf* 108; Atanum River, *Henderson* 2230; Wenache Mountains, *Elmer* 470; *Cotton* 1308; Clallam County, *Elmer* 1919.

Zonal distribution: Hudsonian.

All the Washington specimens that have been referred to *Poa reflexa* belong to *P. leptocoma.*

12. Poa bolanderi Vasey, Bot. Gaz. **7**: 32. 1882.

Type locality: California.

Range: Washington to California.

Specimens examined: Blue Mountains, *Piper* 2558; *Horner* 489, 490.

12a. Poa bolanderi chandleri (Davy).

Poa howellii chandleri Davy, Univ. Cal. Bot. Publ. **1**: 60. 1902.

Type locality: "Shackleford Cañon, near Marble Mt., Siskiyou County," California.

Range: Washington to California.

Specimens examined: Blue Mountains, *Piper* 2558; *Horner* 651, 652; without locality, *Vasey* in 1889.

13. Poa howellii Vasey & Scribn. U. S. Dept. Agr. Div. Bot. Bull. **13**^{2}: *pl. 78.* 1893.

Type locality: Portland, Oregon. Collected by Howell.

Range: British Columbia to California.

Specimens examined: Clallam County, *Elmer* 1924; Seattle, *Piper* 963, 962; *Smith* 962; without locality, *Suksdorf.*

Zonal distribution: Humid Transition.

14. Poa alpina L. Sp. Pl. **1**: 67. 1753.

Type locality: "Habitat in alpibus Lapponicis, Helveticis."

Range: Alaska to Labrador, south to Washington, Colorado, and Quebec. Asia. Europe

Specimens examined: North Fork Bridge Creek, *Elmer* 675.

Zonal distribution: Arctic.

15. Poa pachypholis Piper, Proc. Biol. Soc. Wash. **18**: 146. 1905.

Type locality: "Ilwaco, Washington, on cliffs wet by the ocean spray, June 22, 1904." Not otherwise known.

16. Poa canbyi (Scribn.)

Glyceria canbyi Scribn. Bull. Torr. Club **11**: 77. 1883.

Atropis canbyi Beal, Grasses N. Am. **2**: 580. 1896.

Type locality: Cascade Mountains, Washington. Collected by Tweedy and by Brandegee.

Specimens examined: Mount Stuart, *Sandberg & Leiberg* 819; Cascade Mountains *Tweedy;* Wenache Mountains, *Cotton* 1708.

17. Poa leckenbyi Scribn. U. S. Dept. Agr. Div. Agrost. Circ. **9**: 2. 1899.

Type locality: Scott, Klickitat County, Washington. Collected by Leckenby.

Range: Washington.

SPECIMENS EXAMINED: Sunnyside, *Cotton* 381; Douglas County, *Spillman*, May, 1896; Scott, *Leckenby;* near Eltopia, *Cotton* 1019.

ZONAL DISTRIBUTION: Upper Sonoran.

18. **Poa ampla** Merrill, Rhodora **4**: 145. 1902.

Poa laeviculmis Williams, Bot. Gaz. **36**: 55. 1903.

TYPE LOCALITY: Steptoe, Washington. Collected by G. R. Vasey.

RANGE: British Columbia to Idaho and Oregon.

SPECIMENS EXAMINED: Sprague, *Henderson* 2224; *Sandberg & Leiberg*, June, 1893; Wawawai, *Leckenby* 3000; *Piper* 2567; Spokane, *Piper*, May, 1897; near North Yakima, *Henderson*, May, 1892; Falcon Valley, *Suksdorf* 1127; Douglas County, *Spillman*, May, 1896; Pullman, *Piper* 1755; *Elmer* 173.

ZONAL DISTRIBUTION: Arid Transition.

19. **Poa brachyglossa** Piper, Proc. Biol. Soc. Wash. **18**: 145. 1905.

TYPE LOCALITY: Douglas County, Washington. Collected by Sandberg & Leiberg.

RANGE: Washington to Nevada and California.

SPECIMENS EXAMINED: Wenas, *Griffiths & Cotton* 80; Prosser, *Griffiths & Cotton* 1; Steamboat Rock, *Griffiths & Cotton* 432; Ephrata, *Griffiths & Cotton* 484; Brewster, *Griffiths & Cotton* 260, 264; Condons Ferry, *Griffiths & Cotton* 421; Grand Coulee, *Griffiths & Cotton* 449; Coulee City, *Piper* 3916, 3917, 3918; Cold Creek, *Cotton* 402; Colville Reservation, *Griffiths & Cotton* 401, 374, 396; Cow Creek, *Griffiths & Cotton* 512, 536, 518, 548; Wawawai, *Piper* 3955, 4127.

ZONAL DISTRIBUTION: Arid Transition and Upper Sonoran.

20. **Poa nevadensis** Vasey, Bull. Torr. Club **11**: 66. 1883.

TYPE LOCALITY: Arizona, according to the type specimen.

RANGE: Washington to Arizona.

SPECIMENS EXAMINED: Bingen, *Suksdorf* 2831.

ZONAL DISTRIBUTION: Upper Sonoran.

21. **Poa sandbergii** Vasey, Contr. Nat. Herb. **1**: 276. 1893.

Aira brevifolia Pursh, Fl. 1: 76. 1814, not *Poa brevifolia* Gaud. 1808.

Poa incurva Scribn. & Williams, U. S. Dept. Agr. Div. Agrost. Circ. **9**: 6. 1899.

TYPE LOCALITY: Lewiston, Idaho.

RANGE: British Columbia to Oregon and Idaho.

SPECIMENS EXAMINED: Wenache Mountains, *Griffiths & Cotton* 115; Wenas, *Griffiths & Cotton* 66, 99; Chelan, *Griffiths & Cotton* 170, 173; Stehekin, *Griffiths & Cotton* 208; Conconully, *Griffiths & Cotton* 305; Olympic Mountains, *Elmer* 1929; Washtucna, *Cotton* 979; Waitsburg, *Horner* 501; Steptoe, *Vasey* 8, 13, 7, 11, 14, 67; Rock Creek, *Cotton* 953; Saint Johns, *Cotton* 963; Olympic Mountains, *Piper* 1989.

ZONAL DISTRIBUTION: Mainly Arid Transition.

All of the Washington specimens that have been called *Poa tenuifolia* Nutt. or *Poa buckleyana* Nash are referable to *P. sandbergii*.

22. **Poa paddensis** Williams, U. S. Dept. Agr. Div. Agrost. Bull. **17** rev. ed.: 261. 1901.

Poa purpurascens Vasey, Bot. Gaz. **6**: 297. 1881, not Spreng. 1819.

TYPE LOCALITY: "On Mt. Hood, Oregon." Collected by Howell.

RANGE: British Columbia to Oregon.

SPECIMENS EXAMINED: Olympic Mountains, *Piper* 1915; *Flett* 831; *Elmer* 1925, 1927, 1930; Bridge Creek, *Elmer* 675; Mount Rainier, *Allen* 184; *Piper* 1967; Atanum River, *Henderson* 2244; Mount Adams, *Howell* 83; *Suksdorf* 158, 159.

ZONAL DISTRIBUTION: Arctic.

23. **Poa curtifolia** Scribn. U. S. Dept. Agr. Div. Agrost. Circ. **16**: 3. 1899.

TYPE LOCALITY: Mount Stuart, Washington. Collected by Elmer.

SPECIMENS EXAMINED: Mount Stuart, *Elmer* 1148; Yakima Region, *Tweedy* in 1882.

ZONAL DISTRIBUTION: Arctic.

24. **Poa multnomae** Piper, Bull. Torr. Club **32**: 435. 1905.
Sporobolus bolanderi Vasey, Bot. Gaz. **11**: 337. 1896, not *Poa bolanderi* Vasey, 1882.
Type locality: Multnomah Falls, Oregon.
Range: Washington and Oregon.
Specimens examined: Cape Horn, *Piper* 4902; Klickitat County, *Suksdorf* 77.
Zonal distribution: Humid Transition.

25. **Poa vaseyochloa** Scribn. U. S. Dept. Agr. Div. Agrost. Circ. **9**: 1. 1899.
Poa pulchella Vasey, Bot. Gaz. **7**: 32. 1882, not Salisb. 1796.
Type locality: "On the Columbia river, from near the river bank to the summit of the hills," Klickitat County, Washington. Collected by Suksdorf.
Range: Washington and Oregon.
Specimens examined: White Salmon River, *Suksdorf* 2; Columbia River, Klickitat County, *Suksdorf* 1; Mountains, Klickitat County, *Suksdorf*, April 28, 1881.

26. **Poa gracillima** Vasey, Contr. Nat. Herb. **1**: 272. 1893.
Type locality: Mount Adams, Washington. Collected by Suksdorf.
Range: Washington and Oregon.
Specimens examined: Mount Adams, *Suksdorf* 33; *Howell* 86, 87; *Henderson* 2229; Mount Stuart, *Elmer* 1153.

27. **Poa saxatilis** Scribn. & Williams, U. S. Dept. Agr. Div. Agrost. Circ. **9**: 1. 1899.
Type locality: "Mt. Rainier, Washington, altitude 2100 meters."
Range: Washington to California, in the mountains.
Specimens examined: Olympic Mountains, *Piper* 1993, 983; *Elmer* 1928; *Flett* 834, 97; Mount Rainier, *Piper* 1961, 1962, 1963, 1964; Mount Stuart, *Elmer* 1154, 1155; Blue Mountains, *Piper* 2555.
Zonal distribution: Arctic.

28. **Poa idahoensis** Beal, Grasses N. Am. **2**: 539. 1896.
Poa filifolia Vasey, Contr. Nat. Herb. **1**: 271. 1893, not Schur. 1866.
Poa scabrifolia Heller, Bull. Torr. Club **24**: 310. 1897.
Poa spillmani Piper, Erythea **7**: 102. 1899.
Type locality: Hatwai Creek, Nez Perces County, Idaho.
Range: Washington and Idaho.
Specimens examined: Wenas, *Griffiths & Cotton* 94; Douglas County, *Spillman*, May 27, 1896.
Zonal distribution: Arid Transition.

29. **Poa capillarifolia** Scribn. & Williams, U. S. Dept. Agr. Div. Agrost. Circ. **9**: 1. 1899.
Type locality: California.
Range: Washington to California.
Specimens examined: Cleman Mountain, *Henderson* 2238; Ellensburg, *Piper* 2614, 2615; opposite Clarkston, *Hunter* 42.
Zonal distribution: Arid Transition.

30. **Poa cottoni** Piper, Proc. Biol. Soc. Wash. **18**: 146. 1905.
Type locality: Rattlesnake Mountains, Yakima County, Washington.
Range: Eastern Washington and eastern Oregon.
Specimens examined: Rattlesnake Mountains, *Cotton* 557; *Griffiths & Cotton* 4, 20; Kahlotus, *Cotton* 1010.
Zonal distribution: Arid Transition.

31. **Poa cusickii** Vasey, Contr. Nat. Herb. **1**: 271. 1893.
Type locality: Oregon. Collected by Cusick.
Range: Washington and Oregon.

SPECIMENS EXAMINED: Cleman Mountain, *Henderson* 2246; Wenas, *Griffiths & Cotton* 94; Chelan Butte, *Griffiths & Cotton* 164, 172; Naches River, *Henderson* 2233.

ZONAL DISTRIBUTION: Arid Transition.

32. **Poa lettermani** Vasey, Contr. Nat. Herb. 1: 273. 1893.

TYPE LOCALITY: Gray Peak, Colorado.

RANGE: Washington to Colorado.

SPECIMENS EXAMINED: Mount Rainier, *Piper* 1968, 1969; *Flett* 267.

ZONAL DISTRIBUTION: Arctic.

33. **Poa suksdorfii** (Beal) Vasey; Beal, Grasses N. Am. **2**: 574. 1896.

Atropis suksdorfii Beal, loc. cit.

TYPE LOCALITY: Mount Adams, Washington. Collected by Suksdorf.

RANGE: Washington to Colorado?

SPECIMENS EXAMINED: Mount Rainier, *Allen* 183, *Piper* 1965; Mount Adams, *Flett* 1399, *Henderson* 2227, *Suksdorf* 1116; Mount Stuart, *Elmer* 1147.

ZONAL DISTRIBUTION: Arctic.

POA STENANTHA Trin. is reported in Hooker's Flora as collected on Mount Rainier by Tolmie. No recent collections made in Washington seem referable to this Alaskan species, though its occurrence would not be surprising.

POA CAESIA Smith and POA NEMORALIS L. both appear in Suksdorf's list, but we have seen no specimens that can be so referred.

DISTICHLIS.

1. **Distichlis spicata** (L.) Greene, Bull. Cal. Acad. **2**: 415. 1887. SALTGRASS.

Uniola spicata L. Sp. Pl. 1: 71. 1753.

Distichlis maritima Raf. Journ. Phys. **89**: 104. 1819.

Distichlis spicata laxa Vasey; Beal, Grasses N. Am. **2**: 519. 1896.

Distichlis spicata stricta Scribn. Mem. Torr. Club **5**: 51. 1894.

Poa borealis Hook. Fl. Bor. Am. **2**: 245. 1840.

Brizopyrum boreale Presl, Rel. Haenk. 1: 280. 1830.

TYPE LOCALITY: "Habitat in Americae borealis maritimis."

RANGE: In saline soils throughout the United States.

SPECIMENS EXAMINED: Ophir, *Elmer* 508; Olympics, *Elmer* 1667; Seattle, *Piper* 809; Tacoma, *Flett* 133; Coulee City, *Lake & Hull* 106; *Piper* 3911; Alkali Lake, *Sandberg & Leiberg*, July, 1863; Wilson Creek, *Sandberg & Leiberg*, July, 1893; Douglas County, *Spillman*, May, 1896; State of Washington, *Sandberg & Leiberg* 463; Parker, *A. D. Dunn*; Kittitas County, *Vasey* 58; Lake Omack, *Griffiths & Cotton* 372.

ZONAL DISTRIBUTION: Upper Sonoran to Transition.

FESTUCA. FESCUE.

- Annuals; stamen usually one.
    - Spikelets densely 8 to 13-flowered .... 1. *F. octoflora.*
    - Spikelets loosely 1 to 5, rarely 6-flowered.
        - Branches of the short panicle divergent.
            - Spikelets not at all pubescent .... 2. *F. pacifica.*
            - Spikelets more or less pubescent.
                - Lemma glabrous; glumes hirsute .... 3. *F. confusa.*
                - Lemma hirsute; glumes glabrous .... 4. *F. eriolepis.*
        - Branches of the elongated panicle erect or appressed.
            - First glume ⅓ to ½ as long as the second; lemma ciliate ... 5. *F. megalura.*
            - First glume ⅔ to ¾ as long as the second; lemma not ciliate .. 6. *F. bromoides.*
- Perennials; stamens three.
    - Plants with narrow involute leaves, usually tufted.

Blades at length deciduous from the persisting sheaths...... 11. *F. hallii.*
Blades not deciduous from the sheaths.
Plant producing short rootstocks or stolons............ 7. *F. rubra.*
Plant not producing rootstocks or stolons.
Awns longer than the lemma; ovary hispidulous at apex.................................... 8. *F. occidentalis.*
Awns not longer than the lemma; ovary glabrous.
Leaves closely involute, firm; awns usually well developed............................... 9. *F. ovina.*
Leaves closely involute; awns very short, or none.................................... 10. *F. viridula.*
Plants with flat broad leaves, not densely tufted.
Lemma indurated, not at all keeled....................... 12. *F. elatior.*
Lemma membranous, keeled below.
Florets stipitate at base............................. 13. *F. subuliflora.*
Florets not stipitate at base.......................... 14. *F. subulata.*

1. Festuca octoflora Walt. Fl. Car. 81. 1788.
Festuca tenella Willd. Sp. Pl. **1**: 419. 1797.
Type locality: Carolina.
Range: Throughout most of temperate North America.
Specimens examined: Douglas County, *Spillman*, May 27, 1896; Wilson Creek, *Sandberg & Leiberg*, July, 1893; Wenache, *Whited*, July, 1896; Columbia River, 46° to 49°, *Lyall* in 1860; North Yakima, *Henderson* 2193; Prosser, *Leckenby*, May 2, 1898; Sunnyside, *Cotton* 355; Rattlesnake Mountains, *Cotton* 410; Pasco, *Piper*, May 26, 1899; Spokane, *Leckenby*, June 2, 1898; Marshall Junction, *Piper* 2279; Steptoe, *Vasey*, May, 1900; without locality, *Vasey* in 1889; Spokane, *Kreager* 3; Coulee City, *Piper* 3914.
Zonal distribution: Upper Sonoran and Transition.

2. Festuca pacifica Piper, Contr. Nat. Herb. **10**: 12. 1906.
Type locality: Pullman, Washington.
Range: British Columbia to California and Arizona.
Specimens examined: Klickitat County, *Suksdorf* 1139; Olympia, *Henderson* 2176; Wenache, *Whited* 1228; North Yakima, *Henderson* 2174; Rattlesnake Mountains, *Cotton* 472; Pasco, *Leckenby*, May, 1898; Rock Lake, *Sandberg & Leiberg*, May, 1893; between Coulee City and Waterville, *Spillman*, May, 1896; Steptoe, *Vasey* in 1889; Pullman, *Lake & Hull* 108; *Piper* 1754; Almota, *Piper* 1925; Coulee City, *Piper* 3913.
Zonal distribution: Upper Sonoran and Arid Transition.
This species has commonly been mistaken for the rare Californian *F. microstachys* Nutt

3. Festuca confusa Piper, Contr. Nat. Herb. **10**: 13. 1906.
Type locality: West Klickitat County, Washington.
Range: Washington to California.
Specimens examined: West Klickitat County, *Suksdorf* 1140.
Zonal distribution: Arid Transition.

4. Festuca eriolepis Desv. in Gay, Fl. Chil. **6**: 428. 1853.
Festuca arida Elmer, Bot. Gaz. **36**: 52. 1903.
Type locality: Chile.
Range: Washington to Nevada and California, Chile.
Specimens examined: North Yakima, *Henderson* 2196; Coulee City, *Piper* 3915.
Zonal distribution: Upper Sonoran and Arid Transition.

5. Festuca megalura Nutt. Journ. Acad. Phila. n. ser. **1**: 188. 1847.
Festuca myuros hirsuta Asch. & Graebn. Syn. Mitteleur. Fl. **2**: 558. 1901.
Vulpia myuros hirsuta Hack. Cat. Gram. Port. 24. 1888.

Type locality: "Santa Barbara, Upper California." Collected by Nuttall.

Range: Washington to California. Argentina. Chile. Portugal.

Specimens examined: Clallam County *Elmer*, 1914; East Sound, *Henderson* 2175; Seattle, *Piper;* Spokane, *Leckenby*, June, 1898; Pullman, *Piper* 3062; Steptoe, *Vasey* 18, 20; Waitsburg, *Horner* R 231.

Zonal distribution: Transition.

6. **Festuca bromoides** L. Sp. Pl. **1**: 75. 1753.

Type locality: "Habitat in Anglia, Gallia."

Range: British Columbia to California. Introduced from Europe.

Specimens examined: Seattle, *Piper* 1137; Tacoma, *Flett;* Stuart Island, *Lawrence* 62, 136; Port Crescent, *Lawrence* 257.

7. **Festuca rubra** L. Sp. Pl. **1**: 74. 1753. Red fescue.

Festuca vallicola Rydberg, Mem. N. Y. Bot. Gard. **1**: 57. 1900.

Type locality: European.

Range: Subarctic regions, southward mainly along the seacoasts to California and Virginia, and in the mountains to Colorado. Europe. Asia.

Specimens examined: Near Tacoma, *Flett* 40, *Piper* 2621; Spokane, *Wilkes Expedition; Piper* 2594; Steptoe, *Vasey* 39; Pullman, *Piper* 1930, 3023; *Horner* 909; Clallam County, *Elmer* 1912, 1913; Fairhaven, *Piper* 2607; Port Angeles, *Piper* 2309; Westport, *Henderson* 2173; Kitsap County, *Piper* 848; Seattle, *Piper*, July, 1891; *Smith*, May 29, 1889.

Zonal distribution: Transition.

7a. **Festuca rubra megastachys** Gaud. Fl. Helv. **1**: 287. 1828.

Festuca oregona Vasey, Bot. Gaz. **2**: 126. 1877.

Type locality: Switzerland.

Range: Alaska to Oregon and New Jersey. Europe.

Specimens examined: Klickitat County, *Suksdorf* 1140; Klickitat River, *Suksdorf* 1147.

7b. **Festuca rubra multiflora** (Hoffm.) Asch. & Graebn. Syn. Mitteleur. Fl. **2**: 499. 1900.

Festuca multiflora Hoffm. Deutschl. Fl. ed. 2. 1^1: 50. 1800.

Type locality: Germany.

Range: Washington to Wyoming and California. Maine. Europe.

Specimens examined: Spangle, *Suksdorf* 119.

7c. **Festuca rubra kitaibeliana** (Schultes) Piper, Contr. Nat. Herb. **10**: 23. 1906.

Festuca kitaibeliana Schultes, Mant. **2**: 398. 1824.

Festuca barbata Schrank, Prim. Fl. Salisb. 46. 1792, not L. 1759.

Bromus secundus Presl, Rel. Haenk. **1**: 280. 1830.

Festuca rubra secunda Scribn. Ann. Rep. Mo. Bot. Gard. **10**: 39. 1899.

Festuca rubra pubescens Vasey; Beal, Grasses N. Am. **2**: 607. 1896.

Type locality: "In Hungaria."

Range: Alaska to Oregon, Wyoming, and New England. Europe. Asia.

Specimens examined: Coupeville, *Gardner* 332; west Klickitat County, *Suksdorf* 167.

Zonal distribution: Transition.

This subspecies is easily recognizable by its pubescent lemmas.

8. **Festuca occidentalis** Hook. Fl. Bor. Am. **2**: 249. 1840.

Festuca ovina polyphylla Vasey; Beal, Grasses N. Am. **2**: 597. 1896.

Type locality: "Plains and elevated grounds of the Columbia near the sea." Collected by Douglas.

Range: Idaho and British Columbia to California.

Specimens examined: Clallam County, *Elmer* 1915, 1917; Nisqually Valley, *Allen* 50; Seattle, *Smith*, May 20, 1889, *Piper* 834; Lake Chelan, *Vasey* 65; Skamania County, *Flett* 1385; Spokane, *Piper*, July 2, 1896; Kamiak Butte, *Piper* 3085; Blue Mountains, *Piper*

2556; *Horner* 500; *Lake & Hull* 80; without locality, *Sandberg & Leiberg* 482; Fort Vancouver (ex Hooker); Stehekin, *Griffiths & Cotton* 188.

ZONAL DISTRIBUTION: Transition.

Our plant has been referred to *Festuca ovina heterophylla* of Europe, which, however, is quite different.

9a. Festuca ovina ingrata Hack.; Beal, Grasses N. Am. **2**: 598. 1896.

BLUE BUNCHGRASS.

Festuca ovina oregona Hack.; Beal, op. cit. 599.

Festuca vaseyana Hack.; Beal, op. cit. 601.

Festuca ovina columbiana Beal, op. cit. 599.

TYPE LOCALITY: Oregon. Collected by Howell.

RANGE: British Columbia and Alberta to California and Arizona.

SPECIMENS EXAMINED: Falcon Valley, *Suksdorf* 1142; Cascade Mountains, *Henderson* 2192; Blue Mountains, *Lake & Hull* 85, 76; *Piper* 2410; Ellensburg, *Whited* 640; Ophir, *Elmer* 514; Pullman, *Piper* 1752; *Elmer* 826; Rock Creek, *Piper* 2610; Kamiak Butte, *Piper* 3085; Steptoe, *Vasey*, in 1889; Clarks Springs, *Kreager* 68; Spokane, *Kreager* 41.

ZONAL DISTRIBUTION: Arid Transition.

9b. Festuca ovina supina (Schur) Hack. Mon. Fest. 88. 1882.

Festuca supina Schur, Enum. Pl. Transs. 784. 1866.

TYPE LOCALITY: Transylvania.

RANGE: Arctic regions, southward in the mountains to California, Arizona, and New Hampshire. Europe.

SPECIMENS EXAMINED: Olympic Mountains, *Piper* 1985; *Elmer* 1911; *Flett* 91, 117; Mount Baker, *Flett* 868; Mount Rainier, *Allen* 181; *Piper* 1960, 1958; *Smith* 958; Mount Adams, *Flett* 1400; Klickitat River, *Flett* 1362.

ZONAL DISTRIBUTION: Arctic.

This subspecies has commonly been confused with the flaccid-leaved *F. ovina brachyphylla* (Schultes) Piper (*F. brevifolia* R. Br.)

10. Festuca viridula Vasey, U. S. Dept. Agr. Div. Bot. Bull. **13**: *t. 93*. 1893.

Festuca gracillima Hook. err. det. Thurb. in Wats. Bot. Cal. **2**: 318. 1880.

TYPE LOCALITY: "California."

RANGE: Idaho and Washington to California.

SPECIMENS EXAMINED: Skagit Pass, *Lake & Hull* 116, 121; Peshastin, *Sandberg & Leiberg* 693; Mount Rainier, *Piper* 1959; Mount Adams, *Flett* 1397; *Henderson* 2200; *Suksdorf* 449; Atanum River, *Henderson* 2191; Mount Rainier, *Allen* 180; Mount Carlton, *Kreager* 276, 241; Cascade Mountains, *Vasey* 407.

ZONAL DISTRIBUTION: Hudsonian.

11. Festuca hallii (Vasey) Piper, Contr. Nat. Herb. **10**: 31. 1906.

Melica hallii Vasey, Bot. Gaz. **6**: 296. 1881.

Festuca scabrella major Vasey, Contr. Nat. Herb. **1**: 278. 1893.

TYPE LOCALITY: Rocky Mountains between latitudes 39° and 41°.

RANGE: Washington to Saskatchewan and Colorado.

SPECIMENS EXAMINED: Douglas County, *Spillman*, May 27, 1896; Wenache Mountains, *Elmer* 460; without locality, *Vasey* 38; Steptoe, *Vasey* 5; Wenache Region, *Vasey* 441; Spokane, *Suksdorf* in 1884; Chelan Butte, *Griffiths & Cotton* 165; Colville Reservation, *Griffiths & Cotton* 353.

ZONAL DISTRIBUTION: Arid Transition.

12. Festuca elatior L. Sp. Pl. **1**: 75. 1753. MEADOW FESCUE.

TYPE LOCALITY: "Habitat in Europae pratis fertilissimis."

SPECIMENS EXAMINED: Seattle, *Smith* 1986; Naches River, *Henderson* 2234; Pullman, *Piper* 2020; Colfax, *Vasey* 46.

13. Festuca subuliflora Scribn. in Macoun, Cat. Can. Pl. 2: 396. 1890.
Festuca ambigua Vasey, Contr. Nat. Herb. 1: 277. 1893, not Le Gall. 1852.
Festuca denticulata Beal, Grasses N. Am. 2: 589. 1896.
TYPE LOCALITY: Goldstream, Vancouver Island.
RANGE: Washington to California in the coast region.
SPECIMENS EXAMINED: San Juan County, *Henderson* 2197; Seattle, *Piper* in 1889; Olympia, *Henderson* 2179; Port Crescent, *Lawrence* 278.
ZONAL DISTRIBUTION: Humid Transition.

14. Festuca subulata Trin. in Bong. Mem. Acad. St. Petersb. VI. 2: 173. 1832.
Festuca jonesii Vasey, Contr. Nat. Herb. 1: 278. 1893.
TYPE LOCALITY: Sitka.
RANGE: Alaska to Utah and California.
SPECIMENS EXAMINED: Olympic Mountains, *Elmer* 1916, 1918; Coupeville, *Gardner* 338; Seattle, *Piper* 837, 957, 938; *Smith*, June, 1890; Nisqually Valley, *Allen* 39; *Piper* 1981; Harmony, *G. Hofer*, July 26, 1901; without locality, *Sandberg & Leiberg* 504; Blue Mountains, *Piper*, July 16, 1896; *Lake & Hull* 81; *Horner* 506; Clarks Springs, *Kreager* 38; Chelan County, *Vasey* 5.
ZONAL DISTRIBUTION: Humid Transition to Hudsonian.

PANICULARIA.

- Spikelets linear, 10 to 20 mm. long.
  - Flowering glumes scabrid only on the nerves; spikelets 10 to 17 mm. long .... 1. *P. borealis.*
  - Flowering glumes scabrid all over the back; spikelets 16 to 20 mm. long .... 2. *P. fluitans.*
- Spikelets ovate or oblong, 2 to 8 mm. long.
  - Flowering glume with 5 prominent nerves .... 3. *P. pauciflora.*
  - Flowering glume with 7 prominent nerves.
    - Spikelets 3 to 4 mm. long .... 4. *P. nervata.*
    - Spikelets 4 to 6 mm. long .... 5. *P. americana.*

1. Panicularia borealis Nash, Bull. Torr. Club 24: 348. 1897.
Glyceria borealis Piper, Fl. Palouse Reg. 27. 1901.
TYPE LOCALITY: Van Buren, Maine.
RANGE: New York to California and northward.
SPECIMENS EXAMINED: Valley of Nisqually, *Allen* 441; Seattle, *Piper* 855; Ellensburg, *Whited*, June 29, 1897; North Palouse River, *Vasey*, July 1, 1900; Pullman, *Piper* 1748; without locality, *Sandberg & Leiberg* 701; *Vasey* 57, 517.
ZONAL DISTRIBUTION: Transition.

2. Panicularia fluitans (L.) Kuntze, Rev. Gen. Pl. 2: 782. 1891.
Festuca fluitans L. Sp. Pl. 1: 75. 1753.
Glyceria fluitans R. Br. Prod. Fl. Nov. Holl. 1: 179. 1810.
Panicularia davyi Merrill, Rhodora 4: 145. 1902.
Glyceria leptostachya Buckl. Proc. Acad. Phila. 1862: 95. 1862.
TYPE LOCALITY: European.
RANGE: British Columbia to Newfoundland, southward to New Jersey, Kentucky, and California.
SPECIMENS EXAMINED: Near Montesano, *Heller* 3982; Quinault River, *Lamb* 1400; Vancouver, *Piper* 4905.
ZONAL DISTRIBUTION: Humid Transition.

The Heller and the Lamb specimens agree with the types *Panicularia davyi* and *Glyceria leptostachya*, characterized by having the lemmas puberulent-scabrous and the glumes small and thin. These characters seem to be too variable, however, to accept as specific.

3. Panicularia pauciflora (Presl) Kuntze, Rev. Gen. Pl. **2**: 783. 1891.

Glyceria pauciflora Presl, Rel. Haenk. **1**: 257. 1830.

Panicularia flaccida Elmer, Bot. Gaz. **36**: 55. 1903.

Panicularia multifolia Elmer, Bot. Gaz. **36**: 54.

Type locality: "In sinu Nootka."

Range: British Columbia to California, eastward to Montana and Colorado.

Specimens examined: Olympic Mountains, *Elmer* 1939, 1942, 1941; Cascade Mountains, *Lyall*, in August, 1860; Seattle, *Piper* 810; Valley of Nisqually, *Allen* 49; Ellensburg, *Whited* 686; *Vasey* 363; North Yakima, *Watt*, August, 1895; West Klickitat County, *Suksdorf* 1137; North Palouse River, *Vasey* in 1901; near Colfax, *Vasey* 58; without locality, *Sandberg & Leiberg* 604, 507; Cow Creek, *Griffiths & Cotton* 506; Clallam County, *Elmer* 1940; Rock Lake, *Lake & Hull* 162.

Zonal distribution: Transition.

The original description of *Glyceria pauciflora* does not apply well to our plant, but the name is here used as commonly applied. An examination of the type will doubtless show it to be different, perhaps not of this genus.

4. Panicularia nervata (Willd.) Kuntze, Rev. Gen. Pl. **1**: 783. 1891.

Poa nervata Willd. Sp. Pl. **1**: 389. 1797.

Glyceria nervata Trin. Mem. Acad. St. Petersb. VI. **1**: 365. 1830.

Type locality: "Habitat in America boreali."

Range: British Columbia to Labrador, southward to California, Mexico, and Florida.

Specimens examined: Ellensburg, *Whited* 481 and July, 1897; North Yakima, *Leckenby*, June 1, 1898; Wilson Creek, *Lake & Hull* 95; Spokane County, *Suksdorf* 105; Spokane, *Wilkes Expedition;* between Colfax and Almota, *Brodie;* Union Flat, *Piper*, July 9, 1901; Shotgun Canyon, Palouse River, *Vasey*, July 1, 1900; eastern Washington, *Lake & Hull* 373; Davis' ranch, *Kreager* 224; Kittitas County, *Vasey* 126.

Zonal distribution: Transition.

Specimens collected by Tweedy and Brandegee and referred by Professor Scribner to *Glyceria pallida*[a] are probably a pale form of *P. nervata*. As we have not been able to find the specimens this is purely surmise.

4a. Panicularia nervata elata (Nash).

Panicularia elata Nash, Mem. N. Y. Bot. Gard. **1**: 54. 1900.

Glyceria latifolia Cotton, Bull. Torr. Club **29**: 573. 1902.

Type locality: "Sweet Grass Cañon, Crazy Mountains," Montana.

Range: British Columbia, Washington, Idaho.

Specimens examined: Cascade Mountains, 49°, *Lyall*; Seattle, *Smith* 942; Stampede Pass, *Henderson*, October 4, 1892; west Klickitat County, *Suksdorf* 1136; Railroad Creek, *Elmer* 721; Mount Carlton, *Kreager* 274.

Zonal distribution: Transition, especially Humid.

5. Panicularia americana (Torr.) MacMillan, Met. Minn. 81. 1892.

Poa aquatica americana Torr. Fl. U. S. **1**: 108. 1824.

Glyceria grandis Wats. in Gray, Man. ed. 6. 667. 1890.

Type locality: Deerfield, Massachusetts.

Range: New Brunswick to British Columbia, south to Tennessee and Nevada.

Specimens examined: Sumas Prairie, *Lyall* in 1858; Montesano, *Heller* 4071; Vancouver, *Howell* 362; Loomis, *Elmer* 628; Alma, *Elmer* 534; Ellensburg, *Piper* 2577; Waitsburg, *Horner* 229; Lake Chelan, *Vasey* 523; Cow Creek, *Griffiths & Cotton* 507.

Zonal distribution: Transition.

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[a] Bull. Torr. Club **10**: 78. 1883.

PUCCINELLIA.

Panicle narrow, its base usually inclosed in the upper sheath, erect or the short lower branches sometimes divergent .... 1. *P. angustata.*
Panicle well exserted, the branches becoming divaricate or reflexed......... 2. *P. distans.*

1. Puccinellia angustata (R. Br.) Nash, Bull. Torr. Club **22**: 512. 1895.
Poa angustata R. Br. App. Parry's Voyage 287. 1824.
Glyceria pumila Vasey, Bull. Torr. Club **15**: 48. 1888.
Poa nutkaensis Presl, Rel. Haenk. **1**: 272. 1830.
Type locality: Melville Island.
Range: Seacoasts, arctic regions south to Oregon and Maine.
Specimens examined: Whatcom County, *Suksdorf* 1027.

2. Puccinellia distans (L.) Parl. Fl. Ital. **1**: 367. 1848.
Poa distans L. Mant. **1**: 32. 1767.
Type locality: "Habitat in Austria."
Range: Seacoasts; subarctic regions south to Oregon and New Jersey. Europe.
Specimens examined: Yakima City, *Piper* 2590; Wenas, *Griffiths & Cotton* 102, 73; Seattle, *Piper* 1451; Clallam County, *Elmer* 1910.

None of the above specimens are typical *P. distans*, but in the present confusion of the genus they are tentatively so referred.

BROMUS. Brome grass.

Spikelets strongly flattened.
Awns less than 7 mm. long.
Leaves linear, somewhat involute, pilose.................... 1. *B. subvelutinus*
Leaves linear-lanceolate, flat, not pilose.................... 2. *B. marginatus.*
Awns more than 7 mm. long.
Panicle very broad, the longest rays 15 to 25 cm. long, drooping.. 3. *B. sitchensis.*
Panicle large but the rays not drooping.................... 4. *B. carinatus.*
Spikelets subterete, not strongly flattened.
Native perennials mostly with loose and drooping panicles; lemma usually more or less long-hairy.
Rays of the panicle not drooping.
Panicle branches spreading, stiff; lemma scabrous or short-pubescent over the back....................... 5. *B. orcuttianus.*
Panicle short and erect; lemma pubescent on the sides.. 6. *B. suksdorfii.*
Rays of the panicle drooping.
Plant with rootstocks.................................. 7. *B. laevipes.*
Plants without rootstocks.
Lemma evenly pubescent.
Panicle large, heavy; culms stout............. 8. *B. pacificus.*
Panicle small; culms slender................. 9. *B. eximius.*
Lemma unevenly pubescent...................... 10. *B. richardsonii.*
Introduced annuals or biennials.
Awns much longer than the body of the narrow lemma.
Lemma pubescent; awns 13 to 15 mm. long........... 14. *B. tectorum.*
Lemma not pubescent.
Awns 35 to 45 mm. long........................ 11. *B. maximus.*
Awns less than 30 mm. long.
Panicle a dense head-like cluster............. 12. *B. rubens.*
Panicle loose............................... 13. *B. sterilis.*

Awns shorter than or scarcely exceeding the broad lemma.
Awns minute or wanting .... 15. *B. brizaeformis.*
Awn well developed.
Panicle dense, small .... 16. *B. hordeaceus.*
Panicle loose, open.
Awn twisted and divaricate .... 17. *B. japonicus.*
Awn straight.
Margins of the lemma inrolled in fruit..... 18. *B. secalinus.*
Margins of the lemma not inrolled in fruit. 19. *B. racemosus.*

1. **Bromus subvelutinus** Shear, U. S. Dept. Agr. Div. Agrost. Bull. **23**: 52. 1900.

TYPE LOCALITY: Reno, Nevada.

RANGE: Washington to Nevada and California.

SPECIMENS EXAMINED: North Yakima, *Hunter* 596.

ZONAL DISTRIBUTION: Upper Sonoran.

2. **Bromus marginatus** Nees; Steud. Syn. Pl. Glum. **1**: 322. 1854.

TYPE LOCALITY: "Douglas legit ad fluv. Columbia, St. Louis." This is some undetermined point on the Columbia River.

RANGE: British Columbia to Arizona and Colorado.

SPECIMENS EXAMINED: Fairhaven, *Piper* 2607; Whidby Island, *Gardner* 329; Wenache Lake, *Vasey* 103; Wenache, *Whited* 4; Wenache Mountains, *Whited* 1359; Skamania County, *Flett* 1391; Klickitat River, *Flett* 1391; Ellensburg, *Whited* 440; Union Gap, Yakima River, *Cotton* 448; Tieton River, *Cotton* 484; Blue Mountains, *Piper*, 2565, July 15, 1896; Salmon River, *Horner* 511; Cold Creek, *Cotton* 401; Steptoe, *Vasey* in 1901; Walla Walla, *Shear* 1593; Klickitat County, *Suksdorf* 174; Yakima, *Leckenby* in 1898.

ZONAL DISTRIBUTION: Transition mostly.

This species has commonly but erroneously been called *B. breviaristatus* Hook.

2a. **Bromus marginatus seminudus** Shear, U. S. Dept. Agr. Div. Agrost. Bull. **23**: 55. 1900.

TYPE LOCALITY: "On open mountain side 5 miles above Wallowa Lake, Oregon." Collected by Shear.

RANGE: Washington to Montana, south to California and Utah.

SPECIMENS EXAMINED: Olympic Mountains, *Piper* 1990; *Elmer* 1956; Montesano, *Heller* 3979.

ZONAL DISTRIBUTION: Transition and Canadian.

2b. **Bromus marginatus latior** Shear, U. S. Dept. Agr. Div. Agrost. Bull. **23**: 55. 1900.

TYPE LOCALITY: "Walla Walla, Washington." Collected by Shear.

RANGE: Washington to Wyoming, south to New Mexico and Arizona.

SPECIMENS EXAMINED: Olympic Mountains, *Elmer* 1958; Ellensburg, *Piper*, July 9, 1897; Yakima, *Leckenby*, June 20, 1898; Steptoe, *Vasey* 23; Pullman, *Piper* 1738; Walla Walla, *Shear* 1615.

ZONAL DISTRIBUTION: Arid Transition.

3. **Bromus sitchensis** Trin. in Bong. Mem. Acad. St. Petersb. VI. **2**: 173. 1832.

TYPE LOCALITY: Sitka.

RANGE: Washington to Alaska along the coast.

SPECIMENS EXAMINED: Olympic Mountains, *J. M. Grant*, in 1889; Seattle, *Piper* 3014, 3013; Puyallup, *Piper*, September 2, 1899; Cascade Mountains, *Lyall*, in 1859.

ZONAL DISTRIBUTION: Humid Transition.

4. **Bromus carinatus** Hook. & Arn. Bot. Beech. Voy. 403. 1841.

Bromus hookerianus minor Scribner; Beal, Grasses N. Am. **2**: 614. 1896.

TYPE LOCALITY: California.

RANGE: California to Washington and Idaho.

SPECIMENS EXAMINED: Fairhaven, *Piper* 260; Seattle, *Piper*, May 30, 1890, 818 in part; Tacoma, *Leckenby*, in 1898; Blue Mountains, *Lake & Hull* 65; Walla Walla, *Shear* 1579; Almota, *Piper* 3561; Wawawai, *Piper* 3552; *Horner* 915; Walla Walla, *Shear* 1579; Tacoma, *Leckenby* in 1898.

ZONAL DISTRIBUTION: Upper Sonoran and Transition.

4a. **Bromus carinatus hookerianus** (Thurb.) Shear, U. S. Dept. Agr. Bull. Agrost. **23:** 60. 1900.

Bromus hookerianus Thurb. in Torr. Bot. Wilkes Exped. 493. 1874, not Wiegel. 1772.

Ceratochloa grandiflora Hook. Fl. Bor. Am. **2:** 253. 1840.

Bromus virens Buckl. Proc. Acad. Phila. **1862:** 98. 1862, not Nees. 1829.

TYPE LOCALITY: "Plains of the Columbia", according to the original description. "Upland dry soils on the Multoonah [i. e., the Willamette], 1826", according to ticket on type specimen, collected by Douglas.

RANGE: California to Washington and Idaho.

SPECIMENS EXAMINED: Seattle, *Piper* 818; Lyle, *F. W. Magan*; Klickitat County, *Suksdorf* 16.

ZONAL DISTRIBUTION: Humid Transition.

5. **Bromus orcuttianus** Vasey, Bot. Gaz. **10:** 223. 1885.

TYPE LOCALITY: "Near San Diego", California.

RANGE: South California to Washington.

SPECIMENS EXAMINED: Klickitat River, *Suksdorf* 172; Mount Adams, *Suksdorf* 120.

6. **Bromus suksdorfii** Vasey, Bot. Gaz. **10:** 223. 1885.

TYPE LOCALITY: Mount Adams, Washington. Collected by Suksdorf.

RANGE: Oregon and Washington.

SPECIMENS EXAMINED: Mount Adams, *Suksdorf* 620, 74.

ZONAL DISTRIBUTION: Hudsonian.

7. **Bromus laevipes** Shear, U. S. Dept. Agr. Div. Agrost. Bull. **23:** 45. 1900.

TYPE LOCALITY: "On the Columbia River, west Klickitat County, Washington."

RANGE: California to Washington.

SPECIMENS EXAMINED: West Klickitat County, *Suksdorf* 178.

8. **Bromus pacificus** Shear, U. S. Dept. Agr. Div. Agrost. Bull. **23:** 38. 1900.

Bromus magnificus Elmer, Bot. Gaz. **36:** 53. 1903.

TYPE LOCALITY: "In moist thickets near the seashore south of Seaside, Oregon."

RANGE: Oregon to Alaska along the coast.

SPECIMENS EXAMINED: Snoqualmie Falls, *Piper* 3803; Clallam County, *Elmer* 1957; Granville, *Conard* 343.

ZONAL DISTRIBUTION: Humid Transition.

9. **Bromus eximius** (Shear).

Bromus vulgaris eximius Shear, U. S. Dept. Agr. Div. Agrost. Bull. **23:** 44. 1900.

Bromus ciliatus glaberrimus Suksdorf, Deutsch. Bot. Monatss. **19:** 93. 1901.

TYPE LOCALITY: "Moist, open mountain side 4 miles above Wallowa Lake, Oregon." Collected by Shear.

RANGE: Oregon and Washington.

SPECIMENS EXAMINED: Upper Atanum River, *Henderson*, August 2, 1892; Skamania County, *Suksdorf* 2335.

9a. **Bromus eximius robustus** (Shear).

Bromus vulgaris robustus Shear, U. S. Dept. Agr. Div. Agrost. Bull. **23:** 44. 1900.

TYPE LOCALITY: "In moist thickets near the seashore, Seaside, Oregon." Collected by Scribner and Shear.

RANGE: Oregon to British Columbia and Idaho.

SPECIMENS EXAMINED: Seattle, *Piper* 946; Montesano, *Heller* 3999; Mount Adams, *Suksdorf* 176.

9b. **Bromus eximius umbraticus** nom. nov.

Bromus vulgaris Shear, U. S. Dept. Agr. Div. Agrost. Bull. **23**: 43. 1900, not *Bromus purgans vulgaris* Hook. Fl. Bor. Am. **2**: 252. 1840, nor *B. secalinus vulgaris* Koch, Syn. 819. 1837.

Type locality: Collected in the upper Nisqually Valley, Washington, by Allen (no. 41).

Range: California to British Columbia, east to Montana and Wyoming.

Specimens examined: Olympic Mountains, *Elmer* 1961, 1960; Seattle, *Piper* 945, 946; Tacoma, *Flett* 74; Nisqually Valley, *Allen* 41; Blue Mountains, *Piper* 2563; *Lake & Hull* 79; *Horner* 513, 514; Clarks Springs, *Kreager* 57; Tacoma, *Leckenby;* Klickitat River, *Suksdorf* 177; west Klickitat County, *Suksdorf* 175.

Zonal distribution: Transition.

This species was formerly confused with *B. ciliatus* L., which is not known from within our limits.

10. **Bromus richardsonii pallidus** (Hook.) Shear, U. S. Dept. Agr. Div. Agrost. Bull. **23**: 34. 1900.

Bromus purgans pallidus Hook. Fl. Bor. Am. **2**: 252. 1840.

Type locality: "Saskatchewan to the Rocky Mountains."

Range: Nebraska to Nevada and northward to the Arctic.

Specimens examined: Olympic Mountains, *Elmer;* Snoqualmie Falls, *Piper* 3803; White River, *Vasey* 378; Loomis, *Elmer* 559.

Zonal distribution: Canadian or Hudsonian.

11. **Bromus maximus** Desf. Fl. Atl. **1**: 95. 1800.

Type locality: "Hab. in arvis," Europe.

Specimens examined: Spokane, *Leckenby*, June 2, 1898.

11a. **Bromus maximus gussoni** Parl. Fl. Ital. **1**: 407. 1848.

Bromus gussoni Parl. Rar. Pl. Sic. **2**: 8. 1840.

Type locality: Sicily.

Specimens examined: Tacoma, *Piper*, July, 1897; *Leckenby* in 1898.

12. **Bromus rubens** L. Cent. Pl. **1**: 5. 1755.

Type locality: European.

Specimens examined: Bingen, *Suksdorf* 5077.

13. **Bromus sterilis** L. Sp. Pl. **1**: 77. 1753.

Type locality: European.

Specimens examined: Pullman, *Piper* 2554; Stuart Island, *Lawrence* 169; Walla Walla, *Shear* 1616.

14. **Bromus tectorum** L. Sp. Pl. **1**: 77. 1753.

Type locality: European.

Specimens examined: Spokane, *Piper*, July, 1896; Pasco, *Elmer* 1047; Pullman, *Piper*, July 4, 1899; without locality, *Sandberg & Leiberg* 191; Wallula, *Cotton* 1066.

15. **Bromus brizaeformis** Fisch. & Mey. Ind. Sem. Hort. Petrop. **3**: 30. 1837.

Type locality: "In montibus Talüsch."

Specimens examined: Union Gap, Yakima River, *Cotton* 430; Waitsburg, *Horner* 563; Steptoe, *Vasey* 53; Almota, *Piper* 1739; Wawawai, *Piper* 1739; Pullman, *Piper* 1739; *Elmer* 876.

16. **Bromus hordeaceus** L. Sp. Pl. **1**: 77. 1753.

Bromus mollis L. Sp. Pl. ed. 2. **1**: 112. 1762.

Type locality. European.

Specimens examined. Seattle, *Piper* 796; Steptoe, *Vasey* 22; Almota, *Piper* 3562; Pullman, *Elmer* 878 in part; *Piper*, May, 1894, June 21, 1901; Prosser, *Cotton* 1110; Walla Walla, *Shear* 1585; Tacoma, *Leckenby* in 1898.

16a. Bromus hordeaceus glabrescens (Coss.) Shear, U. S. Dept. Agr. Div. Agrost. Bull. **23**: 20. 1900.

Bromus mollis glabrescens Coss. Fl. Descr. Par. 654. 1845.

Type locality: Paris, France.

Specimens examined: Cold Creek, *Cotton* 495; Kittitas County, *Vasey* 74; Pullman *Elmer* 878 in part.

17. Bromus japonicus Thunb. Fl. Jap. 52. *t. 11.* 1784.

Bromus patulus Mert. & Koch in Röhl. Deutschl. Fl. **1**: 685. 1823.

Type locality: Japan.

Specimens examined: Prosser, *Cotton* 1111.

18. Bromus secalinus L. Sp. Pl. **1**: 76. 1753. Cheat.

Type locality: "Habitat in Europae agris secalinis arenosis."

Specimens examined: Seattle, *Piper* 1987; Fort Colville, *Lyall*, August, 1860; Steptoe, *Vasey* 45, 48; Waitsburg, *Horner* 521.

19. Bromus racemosus commutatus (Schrad.) Hook. f. Stud. Fl. Brit. Isl. 451. 1870.

Bromus commutatus Schrad. Fl. Germ. 353. 1806.

Type locality: Germany.

Specimens examined: Clallam County, *Elmer* 1959; Montesano, *Heller* 3983; Seattle *Piper* 944; Pullman, *Elmer* 886; *Piper* 3926.

SPARTINA.

Plant stout; spikelets 12 to 14 mm. long.................................. 1. *S. pectinata.*
Plant slender; spikelets 6 to 9 mm. long.................................. 2. *S. gracilis.*

1. Spartina pectinata Link, Jahrb. 1^3: 92. 1820.

Type locality: "Aus Nordamerika."

Range: Nova Scotia to Washington, south to New Jersey, Indian Territory, and Oregon.

Specimens examined: Pend Oreille River, *Lyall* in 1861, Almota, *Piper* 2372; Kalispel Lake, *Kreager* 339

Zonal distribution: Upper Sonoran to Transition.

This species has commonly been known as *Spartina cynosuroides* (L.) Michx., but the type of *Dactylis cynosuroides* is the species known as *Spartina polystachya* Michx.

2. Spartina gracilis Trin. Mem. Acad. St. Petersb. VI. 6^2: 110. 1840.

Type locality: "Amer. Bor."

Range: British Columbia to California, eastward to North Dakota and Kansas.

Specimens examined: Loomis, *Elmer* 891; Coulee City, *Henderson* 2248, *Piper* 3910; Wilson Creek, *Sandberg & Leiberg* 248; Silver Lake, *Henderson* 2248; without locality, *Brandegee* 1152; Okanogan, *Griffiths & Cotton* 266; Grand Coulee, *Griffiths & Cotton* 450; Condons Ferry, *Griffiths & Cotton* 418.

Zonal distribution: Upper Sonoran.

BECKMANNIA.

1. Beckmannia erucaeformis (L.) Host. Gram. Austr. **3**: 5. 1805.

Phalaris erucaeformis L. Sp. Pl. **1**: 55. 1753.

Type locality: "Habitat in Siberia, Russia, Europa australi."

Range: Ontario to British Columbia, south to Iowa, Colorado, and California.

Specimens examined: Loomis, *Elmer* 587; Toppenish *Henderson*, May, 1892; Pullman, *Piper* 1750; Union Flat, Whitman County, *Lake & Hull* 109; Steptoe, *Vasey* 62, Ellensburg, *Vasey* 495; Cow Creek, *Griffiths & Cotton* 519.

Zonal distribution: Arid Transition.

CAPRIOLA.

1. **Capriola dactylon** (L.) Kuntze, Rev. Gen. Pl. **2**: 764. 1891. BERMUDA GRASS.
Panicum dactylon L. Sp. Pl. **1**: 58. 1753.
Cynodon dactylon Pers. Syn. **1**: 85. 1805.
TYPE LOCALITY: "Hab. in Europa australi."
SPECIMENS EXAMINED: North Yakima, *Leckenby*, August, 1897.

SCRIBNERIA.

1. **Scribneria bolanderi** (Thurb.) Hackel, Bot. Gaz. **11**: 105. 1886.
Lepturus bolanderi Thurb. Proc. Am. Acad. **7**: 401. 1868.
TYPE LOCALITY: "Dry gravelly soil, Russian River Valley, California." Collected by Bolander.
RANGE: Washington to California.
SPECIMENS EXAMINED: Near Major Creek, *Suksdorf* 913.
ZONAL DISTRIBUTION: Arid Transition.

LOLIUM.

Glumes equaling or exceeding the spikelet without the awns.......... 1. *L. temulentum.*
Glumes shorter than the spikelet .... 2. *L. perenne.*

1. **Lolium temulentum** L. Sp. Pl. **1**: 83. 1753.
TYPE LOCALITY: "Habitat in Europae agris inter Hordeum, Linum."
SPECIMENS EXAMINED: Seattle, *Smith* 794.

2. **Lolium perenne** L. Sp. Pl. **1**: 83. 1753. PERENNIAL RYEGRASS.
TYPE LOCALITY: "Habitat in Europa ad agrorum versuras solo fertili."
SPECIMENS EXAMINED: Seattle, *Smith* 786; Montesano, *Heller* 3981.

AGROPYRON. WHEAT GRASS.

Plants densely tufted, seldom producing stolons.
    Glumes awnless.
        Spikelets flattened, somewhat remote....................... 1. *A. spicatum.*
        Spikelets subterete, close.
            Lemmas long-awned.................................... 2. *A. richardsonii.*
            Lemmas awnless, or very short-awned.
                Spikes slender, 5 to 20 cm. long; lower glume 5-nerved 3. *A. tenerum.* ✓
                Spikes short, 2 to 7 cm. long; lower glume 3-nerved . 4. *A. biflorum.*
    Glumes awned.
        Awns short; glumes lanceolate.............................. 5. *A. gmelini.*
        Awns long; glumes subulate.
            Spike dense; herbage pubescent .... 6. *A. saxicola.*
            Spike loose; herbage glabrous.......................... 7. *A. flexuosum.*
Plants not tufted, producing abundant stolons.
    Lemma hairy.
        Spike rather dense; lemmas villous......................... 8. *A. subvillosum.*
        Spike loose, elongate; lemmas puberulent .... 9. *A. lanceolatum.*
    Lemma not hairy, usually glabrous.
        Leaves scabrous on both sides.............................. 10. *A. occidentale.* ✓
        Leaves smooth beneath, pubescent above..................... 11. *A. repens.*

1. **Agropyron spicatum** (Pursh) Scribn. & Smith, U. S. Dept. Agr. Div. Agrost. Bull. **4**: 33. 1897. WHEAT BUNCHGRASS. PLATE XIX.
Festuca spicata Pursh, Fl. **1**: 83. 1814.
Agropyron divergens Nees in Steud. Syn. Plant. Glum. **1**: 347. 1854.

Type locality: Type collected by Lewis June 10, 1806, then at "Camp Chopunnish," opposite Kamiah, Idaho.

Range: Washington and Montana to Colorado.

Specimens examined: Wenache, *Whited*, 1147; Ellensburg, *Whited* 650; Yakima, *Henderson* 2140; Skamania County, *Flett* 1383; Tieton River, *Cotton* 451; Steptoe, *Vasey* 36; Pullman, *Piper* 1760; Blue Mountains, *Sandberg & Leiberg* 583; *Lake & Hull* 77; *Horner* 519, 515; *Piper* 2562; Almota, *Piper* 1753; Wawawai, *Elmer* 750; *Piper* 1911, 3001, 3954, 3960, 3525.

Zonal distribution: Arid Transition and Upper Sonoran.

For illustration of a bunchgrass prairie see Plate XI, facing page 48.

1a. **Agropyron spicatum inerme** (Scribn. & Smith) Heller, Cat. N. A. Pl. ed. 2. 3. 1900.

Agropyron divergens inerme Scribn. & Smith, U. S. Dept. Agr. Div. Agrost. Bull. 4: 27. 1897.

Agropyron vaseyi Scribn. & Smith, loc. cit.

Type locality: "British Columbia to Utah and Idaho."

Range: British Columbia to Utah and Oregon.

Specimens examined: Wenache Mountains, *Whited* 1231, 1265; Wenache, *Whited* 1376; Stehekin, *Whited* 1395; between Coulee City and Waterville, *Spillman*, May, 1896; Waitsburg, *Horner* 235, 234; Lake Chelan, *Vasey* 169; Spokane, *Piper* 2612; Pullman, *Piper* 1913; Wawawai, *Piper* 1916, 3004½, 3962; *Elmer* 753; Almota, *Piper* 1915; Big Meadow, *Kreager* 419; Whitman County, *Henderson* 2132.

The last-named specimen is the type of *Agropyron vaseyi* Scribn. & Smith.

Zonal distribution: Arid Transition.

1b. **Agropyron spicatum puberulentum** nom. nov.

Agropyron spicatum pubescens Elmer, Bot. Gaz. 36: 52. 1903, not *Triticum repens pubescens* Döll. Fl. Bad. 129. 1857.

Type locality: Mount Stuart, Kittitas County, Washington. Collected by Elmer.

Range: Eastern Washington.

Specimens examined: Mount Stuart, *Elmer* 1157, 1158.

2. **Agropyron richardsoni** (Trin.) Schrad.; Shear, U. S. Dept. Agr. Div. Agrost. Bull. 4: 29. 1897.

Triticum richardsoni Trin. Linnaea 12: 467. 1838.

Type locality: "America borealis arctica?"

Range: British Columbia to New England, south to the Black Hills and California.

Specimens examined: Loomis, *Griffiths & Cotton* 340; Cow Creek, *Griffiths & Cotton* 511; Yakima Ridge, *Cotton* 1411; Kittitas Valley, *Cotton* 1329.

Zonal distribution: Arid Transition.

This species is exceedingly close to *A. caninum* Roem. & Schult., to which indeed some of the specimens may be referable.

3. **Agropyron tenerum** Vasey, Bot. Gaz. 10: 258. 1885.

Agropyron pseudorepens Scribn. & Smith, U. S. Dept. Agr. Div. Agrost. Bull. 4: 34. 1897.

Type locality: Fort Garland, Colorado, according to the label of the type specimen.

Range: Alaska to Labrador, south to New England, Colorado, and California.

Specimens examined: Bridge Creek, *Elmer* 679; Yakima, *Leckenby*, June, 1898; *Piper* 2844; Johns Island, *Cotton* 208; Seattle, *Piper*, June 20, 1889; Rattlesnake Mountains, *Cotton* 667; Toppenish, *Cotton* 793; Prosser, *Cotton* 744; Squaw Creek, *Cotton* 878; Cow Creek, *Griffiths & Cotton* 509, 533; Conconully Creek, *Griffiths & Cotton* 293; Olympia to Gate City, *Heller* 4059; Ellensburg, *Piper* 2587; Yakima, *Watt*, July, 1895; Spokane, *Piper* 2595; *Henderson*, July, 1892; Palouse, *Henderson* 2139; Pullman, *Piper* 1910.

Zonal distribution: Upper Sonoran and Transition.

4. **Agropyron biflorum** (Brign.) Roem. & Schult. Syst. 2: 760. 1817.

Agropyron biflorum Brign. Pl. Rar. Foroj. 18. 1810.

Type locality: Not ascertained.

Specimens examined: Wenache, *Whited* in 1895; North Yakima, *Watt*, July, 1895; Ophir, *Elmer* 512; Coupeville, *Gardner* 320, 334.

Zonal distribution: Transition and Upper Sonoran.

The *Agropyron glaucum* of Suksdorf's List is based on specimens of *A. occidentale*.

11. **Agropyron repens** (L.) Beauv. Agrost. 102, 146. 1812. Quack grass.

Triticum repens L. Sp. Pl. 1: 86. 1753.

Type locality: "Habitat in Europae cultis."

Specimens examined: Vancouver, *Piper*, July 20, 1897; Walla Walla, *Leckenby*, July 18, 1899; North Palouse River, *Vasey*, July 3, 1901.

HORDEUM. Wild barley.

Floret of the central spikelet pediceled; glumes ciliate................ 1. *H. murinum.*
Floret of the central spikelet sessile; glumes not ciliate.
  Glumes all alike, subulate.
    Lateral florets long-awned.
      Awns 4 to 6 cm. long.................................. 2. *H. jubatum.*
      Awns 2 to 3 cm. long.
        Sheaths and blades glabrous........................ 3. *H. caespitosum.*
        Sheaths and blades pilose.......................... 4. *H. comosum.*
    Lateral florets not awned.
      Lateral florets neutral.................................. 5. *H. nodosum.*
      Lateral florets perfect.................................. 6. *H. boreale.*
  Glumes not all subulate, the inner ones obliquely lanceolate....... 7. *H. geniculatum.*

1. **Hordeum murinum** L. Sp. Pl. 1: 85. 1753. Wall barley.

Type locality: "Habitat in Europae locis ruderatis."

Specimens examined: Seattle, *Piper;* Tacoma, *Piper* 2602; Ellensburg, *Piper* 2582; Waitsburg, *Horner* 246; Almota, *Piper* 3560; Wallula, *Cotton* 1045.

2. **Hordeum jubatum** L. Sp. Pl. 1: 85. 1753. Squirrel tail.

Type locality: "Habitat in Canada."

Range: Alaska to Ontario, south to California and Kansas.

Specimens examined: Seattle, *Piper* in 1889; North Yakima, *Henderson* 2208; Parker, *A. D. Dunn*, August 11, 1901; Pullman, *Piper* 1746; Spokane, *Piper*, June, 1897; Steptoe, *Vasey* 49.

Zonal distribution: Arid Transition and Upper Sonoran.

3. **Hordeum caespitosum** Scribn. Proc. Davenp. Acad. Sci. 7: 245. 1899.

Type locality: Edgemont, South Dakota.

Range: Washington to Assiniboia, Kansas, and Utah.

Specimens examined: Tacoma, *Leckenby*, June 3, 1898; Alma, *Elmer* 535; near Columbus, *Suksdorf* 218; without locality, *Sandberg & Leiberg* 245; Ephrata, *Griffiths & Cotton* 463; Priest Rapids, *Cotton* 1384, 1404; Kiona, *Cotton* 718; Grand Coulee, *Griffiths & Cotton* 445.

Zonal distribution: Arid Transition.

4. **Hordeum comosum** Presl, Rel. Haenk. 1: 327. 1830.

Type locality: Chile.

Range: Washington. Chile.

Specimens examined: Alma, *Elmer* 535; Colville Reservation, *Griffiths & Cotton* 363.

Zonal distribution: Arid Transition.

5. **Hordeum nodosum** L. Sp. Pl. ed. 2. 1: 126. 1762.

Type locality: "Habitat in Italia, Anglia."

Range: North temperate America, Asia, and Europe.

SPECIMENS EXAMINED: Olympic Mountains, *Flett* 830; Fairhaven, *Piper* 2603; Seattle, *Smith* 803; Tacoma, *Flett* 45, *Leckenby;* Columbia River, 46° to 49°, *Lyall* in 1860; Steptoe, *Vasey* 16; without locality, *Sandberg & Leiberg* 245; Box Canyon, Pend Oreille River, *Kreager* 433.

ZONAL DISTRIBUTION: Transition.

5a. Hordeum nodosum depressum Scribn. & Smith, U. S. Dept. Agr. Div. Agrost. Bull. **4**: 24. 1897.

TYPE LOCALITY: Near Lexington, Morrow County, Oregon. Collected by Leiberg.

RANGE: Washington to California.

SPECIMENS EXAMINED: Klickitat County, *Suksdorf* in 1886; Washtucna, *Cotton* 990.

6. Hordeum boreale Scribn. & Smith, U. S. Dept. Agr. Div. Agrost. Bull. **4**: 24. 1897.

TYPE LOCALITY: "Aleutian Islands and Alaska to Oregon and California."

RANGE: Alaska to California.

SPECIMENS EXAMINED: Pullman, *Piper* 1747; Steptoe, *Vasey,* July 2, 1901; Kittitas County, *Vasey* 49; west Klickitat County, *Suksdorf* 1168.

ZONAL DISTRIBUTION: Transition.

7. Hordeum geniculatum All. Fl. Ped. **2**: 259. 1785.

Hordeum maritimum With. Bot. Arr. Brit. Veg. ed. 3. **2**: 172. 1796.

TYPE LOCALITY: Piedmont, Italy.

SPECIMENS EXAMINED: Seattle, *Smith* 814; Dry Creek, Whitman County, *Vasey* 52; Waitsburg, *Horner* 247; Walla Walla, *Leckenby,* May 19, 1898, *Griffith & Cotton* 556.

ELYMUS. RYEGRASS.

Annual; glumes rigid, spreading .... 1. *E. caput-medusae*
Perennials.
Tufted grasses without rootstocks.
Culms stout, 1 to 2 meters high.
Spikelets 1 to 1.5 cm. long, usually glabrous or scabrous. 9. *E. condensatus.*
Spikelets 2 to 3 cm. long, pubescent .... 10. *E. arenarius.*
Culms slender, seldom 1 meter high.
Lemma pubescent; spike nodding .... 2. *E. canadensis.*
Lemma not pubescent; spike erect.
Glumes subulate.
Awns of lemma 30 to 40 mm. long .... 3. *E. leckenbyi.*
Awns of lemma 3 to 5 mm. long .... 4. *E. aristatus.*
Glumes lanceolate.
Awns of lemma well developed.
Spikes dense; lemma not ciliate .... 5. *E. glaucus.*
Spikes usually interrupted; lemma ciliate. 6. *E. borealis.*
Awns of lemma short or obsolete.
Glumes rigid, longer than the spikelet.. 7. *E. virginicus.*
Glumes not rigid, shorter than the spikelet .... 8. *E. virescens.*
Not tufted but spreading by long rootstocks.
Lemmas long-villous .... 11. *E. flavescens.*
Lemmas not long-villous.
Spike dense; lemma scabrous-puberulent; glumes sparsely hirsute .... 12. *E. vancouverensis.*
Spike not dense; glumes not hirsute.
Lemma glabrous, usually glaucous .... 13. *E. triticoides.*
Lemma puberulent............................ 14. *E. arenicola.*

1. **Elymus caput-medusae** L Sp. Pl. 1: 84. 1753.
TYPE LOCALITY: "Habitat in Lusitaniae, Hispaniae maritimis."
SPECIMENS EXAMINED: Steptoe, *Vasey* 3076.

2. **Elymus canadensis** L. Sp. Pl. 1: 83. 1753.
Sitanion brodiei Piper, Erythea 7: 100. 1899.
TYPE LOCALITY: "Habitat in Canada."
RANGE: Canada to Washington, south to Georgia and Texas.
SPECIMENS EXAMINED: Alma, *Elmer* 518; Naches Valley, *Piper* 2584; Columbia River, 46° to 49°, *Lyall* in 1860; Box Canyon, *Kreager* 381; Pend Oreille River, *Lyall* in 1861; Wawawai, *Brodie*, July, 1898; Waitsburg, *Piper* 2561; *Horner*, July, 1896; Kiona, *Cotton* 728; Mabton, *Cotton* 745; Parker, *Dunn*; Bishops Bar, *Brodie*, July, 1898.
ZONAL DISTRIBUTION: Upper Sonoran and Arid Transition.

3. **Elymus leckenbyi** Piper.
Sitanion leckenbyi Piper, Erythea 7: 100. 1899.
TYPE LOCALITY: "Sandy bars of Snake River at Wawawai, Wash." Collected by Piper and Leckenby.
RANGE: Eastern Washington.
SPECIMENS EXAMINED: Wawawai, *Piper* 3003, 3963, 3959, 3969, 3972; *Leckenby* 86.
ZONAL DISTRIBUTION: Upper Sonoran.

4. **Elymus aristatus** Merrill, Rhodora 4: 147. 1902.
TYPE LOCALITY: "Silver Creek, Harney Co., Oregon."
RANGE: Washington and Oregon.
SPECIMENS EXAMINED: Falcon Valley, *Suksdorf* 5194, July 16, 1905.

5. **Elymus glaucus** Buckl. Proc. Acad. Phila. **1862**: 99. 1862.
Elymus americanus Vasey & Scribn.; Macoun, Cat. Can. Plants 2: 245. 1888.
TYPE LOCALITY: "Columbia River." Collected by Nuttall.
RANGE: Alaska to the Great Lakes, Missouri, and California.
SPECIMENS EXAMINED: Olympic Mountains, *Flett* 839, 833; Fairhaven, *Piper* 2608; Mason County, *Piper*, July, 1890; Tacoma, *Leckenby*, August, 1898; Falcon Valley, *Suksdorf* 2151; Ellensburg, *Whited* 687; Yakima, *Leckenby*, June 20, 1898; Wenache, *Whited* 1301; Whitman County, *Piper*, July, 1894; Wind River, *Flett* 1393; Wawawai, *Piper*, June, 1896, 2566, 2999, 3058; Blue Mountains, *Lake & Hull* 78, 82.
ZONAL DISTRIBUTION: Mainly Transition.

6. **Elymus borealis** Scribn. U. S. Dept. Agr. Div. Agrost. Circ. 27: 9. 1900.
Elymus ciliatus Scribn. U. S. Dept. Agr. Div. Agrost. Bull. **11**: 57. 1898, not Muhl. Gram. 179. 1817.
TYPE LOCALITY: "Common in wet places, Sitka, Alaska."
RANGE: Alaska to Washington.
SPECIMENS EXAMINED: Olympic Mountains, *Piper* 1992; *Flett* 833; *Elmer* 1907.
ZONAL DISTRIBUTION: Hudsonian.

7. **Elymus virginicus submuticus** Hook. Fl. Bor. Am. 2: 255. 1840.
Elymus curvatus Piper, Bull. Torr. Club 30: 233. 1903.
TYPE LOCALITY: "Cumberland House Fort, on the Saskatchewan."
RANGE: Washington to Ontario and south to Kansas.
SPECIMENS EXAMINED: Box Canyon, *Kreager* 375.

8. **Elymus virescens** Piper, Erythea 7: 101. 1899.
TYPE LOCALITY: "In damp coniferous woods, 3,000 ft. altitude, Olympic Mts., near the head of the Duckaboose River." Collected by Piper. Not otherwise known.

9. **Elymus condensatus** Presl, Rel. Haenk. 1: 265. 1830.

TYPE LOCALITY: "Ad Monte-Rey Californiae."

RANGE: British Columbia to Alberta, southward to California and Nebraska.

SPECIMENS EXAMINED: Ophir, *Elmer* 520; Ellensburg, *Piper* 2588; *Vasey* 71; North Yakima, *Watt* 2270; Yakima, *Piper* 2592; Pasco, *Henderson* 2167; Klickitat County, *Suksdorf* 1172; Clarks Springs, *Kreager* 59; Pullman, *Piper* 1751; Steptoe, *Vasey* 64; Wawawai, *Piper* 2593.

ZONAL DISTRIBUTION: Upper Sonoran and Arid Transition.

9a. **Elymus condensatus pubens** Piper, Erythea 1: 101. 1899.

TYPE LOCALITY: "In strong alkali soil near Yakima City, Wash." Collected by Piper. Known only from the original locality.

10. **Elymus arenarius** L. Sp. Pl. 1: 83. 1753.

TYPE LOCALITY: "Habitat ad Europae litora marina in arena mobili."

RANGE: On sea and lake shores, Greenland to Labrador, Alaska to Washington and the Great Lakes. Europe. Asia.

SPECIMENS EXAMINED: Fairhaven, *Piper* 2606; Whatcom, *Suksdorf* 1028; Clallam County, *Elmer* 1906; Seattle, *Piper* 813; Westport, *Henderson* 2169.

ZONAL DISTRIBUTION: Humid Transition.

11. **Elymus flavescens** Scribn. & Smith, U. S. Dept. Agr. Div. Agrost. Bull. 8: 8. 1897.

TYPE LOCALITY: Columbus, Klickitat County, Washington. Collected by Suksdorf.

RANGE: Washington, Oregon, and Idaho.

SPECIMENS EXAMINED: Klickitat County, *Leckenby*, May, 1898; Columbus *Suksdorf* 916; Eureka, *Nelson*, July 4, 1899.

ZONAL DISTRIBUTION: Upper Sonoran.

12. **Elymus vancouverensis** Vasey, Bull. Torr. Club 15: 48. 1888.

TYPE LOCALITY: Vancouver Island. Collected by Macoun.

RANGE: Seacoast of Washington and British Columbia.

SPECIMENS EXAMINED: Coupeville, *Gardner*, September 1, 1899; Seattle, *Piper* 812, 2858; *Howell* 207.

ZONAL DISTRIBUTION: Humid Transition.

13. **Elymus triticoides** Buckl. Proc. Acad. Phila. 1862: 99. 1862.

TYPE LOCALITY: "Rocky Mountains."

RANGE: Washington to Colorado, Arizona, and California.

SPECIMENS EXAMINED: Kittitas County, *Sandberg & Leiberg* 437; Ellensburg, *Piper* 2586; *Whited* 519; North Yakima, *Henderson* 2172; Klickitat County, *Suksdorf* 2124; Wawawai, *Piper* 1911, 3066; *Elmer* 1021; Walla Walla, *Leckenby* 90; North Yakima, *Griffiths & Cotton* 334; Colville Reservation, *Griffiths & Cotton* 364; Seattle, *Howell* 206?

ZONAL DISTRIBUTION: Upper Sonoran.

14. **Elymus arenicola** Scribn. & Smith, U. S. Dept. Agr. Div. Agrost. Circ. 9: 7. 1899.

TYPE LOCALITY: "Suferts, Oregon." Collected by A. B. Leckenby.

RANGE: Washington and Oregon.

SPECIMENS EXAMINED: Rockland, Klickitat County, *Suksdorf* 1176; Walla Walla, *Leckenby*, May, 1898; without locality, *Sandberg & Leiberg* 466, 468; *Brandegee* 1202.

ZONAL DISTRIBUTION: Upper Sonoran.

This species has been referred erroneously to *E. dasystachys littoralis* Griseb.

SITANION.

Glumes cleft or parted into 3 to many lobes; awns of lemmas 8 to 10 cm. long.. 1. *S. jubatum.*
Glumes entire or only 2-cleft or 2-parted.
Nerves of the glumes two.
Glumes entire; lemma glaucous, 1 cm. long................ 2. *S. brevifolium.*
Glumes or some of them bifid or 2-parted.
Sheaths and upper surface of leaves glabrous.
Leaves strongly involute.......................... 6. *S. basalticola.*
Leaves flat or tardily involute.
Blades 5 to 7 mm. broad..................... 5. *S. latifolium.*
Blades 2 to 5 mm. broad.
Low plants; awns of lemmas 3 to 4 cm. long. 3. *S. rigidum.*
Taller; awns of lemmas 4 to 5 cm. long... 4. *S. glabrum.*
Sheaths and upper surface of leaves pubescent.
Awns 2 to 3 times as long as lemma.............. 7. *S. ciliatum.*
Awns 4 to 5 times as long as lemma.
Innovations many; culm leaves 7 to 12 cm. long. 8. *S. hystrix.*
Innovations few; culm leaves 2 to 6 cm. long.. 9. *S. velutinum.*
Nerves of the glumes 3 to 5.
Leaves glaucous, 5 to 8 mm. broad......................... 10. *S. planifolium.*
Leaves green, 2 to 5 mm. broad............................ 11. *S. rubescens.*

1. **Sitanion jubatum** J. G. Smith, U. S. Dept. Agr. Div. Agrost. Bull. **18**: 10. 1899.
Sitanion villosum J. G. Smith, U. S. Dept. Agr. Div. Agrost. Bull. **18**: 11. 1899.
Sitanion strictum Elmer, Bot. Gaz. **36**: 59. 1903.
TYPE LOCALITY: "Waitsburg, Wash." Collected by Horner.
RANGE: Washington to California.
SPECIMENS EXAMINED: Waitsburg, *Horner* 249, 573; Wawawai, *Piper* 2998; Pullman, *Piper* 3021; Walla Walla, *Shear* 1602; *Griffiths & Cotton* 554; Waitsburg, *Horner* 574; Spokane, *Piper* 2598; Pullman, *Piper*, July 28, 1899; Wawawai, *Piper* 3528, 3958, 3970, 3529; Clarks Springs, *Kreager* 99; Almota, *Elmer* 266.
ZONAL DISTRIBUTION: Upper Sonoran and Arid Transition.

2. **Sitanion brevifolium** J. G. Smith, U. S. Dept. Agr. Div. Agrost. Bull. **18**: 17. 1899.
TYPE LOCALITY: Tucson, Arizona.
RANGE: Washington to Colorado and Arizona.
SPECIMENS EXAMINED: Falcon Valley, *Suksdorf* 5193, July 16, 1905.

3. **Sitanion rigidum** J. G. Smith, U. S. Dept. Agr. Div. Agrost. Bull. **18**: 13. 1899.
TYPE LOCALITY: "Cascade Mountains, Washington." Collected by Allen.
RANGE: Washington to California and Wyoming.
SPECIMENS EXAMINED: Olympic Mountains, *Flett* 119, 832; Goat Mountains, *Allen* 178; Mount Stuart, *Elmer* 1145; Mount Chapaca, *Elmer*, August, 1897; Blue Mountains, *Horner* 579; without locality, *Vasey* 454.
ZONAL DISTRIBUTION: Arctic.

4. **Sitanion glabrum** J. G. Smith, U. S. Dept. Agr. Div. Agrost. Bull. **18**: 14. 1899.
TYPE LOCALITY: "Near Crystal Spring, Caso Mountains, California."
RANGE: Washington to California.
SPECIMENS EXAMINED: Olympic Mountains, *Elmer* 1904; Mount Rainier, *Piper* 1952; Mount Adams, *Henderson*, August, 1892; head of Twenty-five-mile Creek, *Gorman* 824.
ZONAL DISTRIBUTION: Arctic.

5. **Sitanion latifolium** Piper, Erythea **7**: 99. 1899.
TYPE LOCALITY: "Blue Mts., Walla Walla County, Wash." Collected by Piper.
RANGE: Known only from the type specimen.
SPECIMENS EXAMINED: Blue Mountains, Walla Walla County, *Piper*, July, 1896.

6. **Sitanion basalticola** Piper, Bull. Torr. Club **30**: 234. 1903.
TYPE LOCALITY: "In basaltic soil, Coulee City, Washington." Collected by Piper.
RANGE: Douglas County, Washington.
SPECIMENS EXAMINED: Coulee City, *Piper* 3924.
ZONAL DISTRIBUTION: Arid Transition.

7. **Sitanion ciliatum** Elmer, Bot. Gaz. **36**: 58. 1903.
TYPE LOCALITY: "On dry rocky hills west of Wenatchee," Washington. Collected by Whited.
RANGE: Washington.
SPECIMENS EXAMINED: Wenache Mountains, *Whited* 1360; Waterville, *S. E. Jordan;* Coulee City, *Piper* 3923; Lincoln County, *Sandberg & Leiberg* 221; Bickleton, *Suksdorf* 127.
ZONAL DISTRIBUTION: Arid Transition.

8. **Sitanion hystrix** (Nutt.) J. G. Smith, U. S. Dept. Agr. Div. Agrost. Bull. **18**: 15. 1899.
Aegilops hystrix Nutt. Gen. **1**: 86. 1818.
Sitanion albescens Elmer, Bot. Gaz. **36**: 57. 1903.
TYPE LOCALITY: "Arid plains of the Missouri."
RANGE: Washington to Wyoming and Colorado.
SPECIMENS EXAMINED: Ellensburg, *Piper* 2579; *Whited* 670; Snipes Mountain, *Cotton* 380; Pasco, *Piper* 2962; Coulee City, *Piper* 3921, 3922; Spokane, *Piper*, June 25, 1897; Wenas, *Griffiths & Cotton* 76; Walla Walla, *Leckenby*, July, 1898.
ZONAL DISTRIBUTION: Upper Sonoran and Arid Transition.

9. **Sitanion velutinum** Piper, Bull. Torr. Club **30**: 233. 1903.
TYPE LOCALITY: "Steptoe, Whitman County, Washington." Collected by Vasey.
RANGE: Eastern Washington.
SPECIMENS EXAMINED: Near Steptoe, *Vasey*.

10. **Sitanion planifolium** J. G. Smith, U. S. Dept. Agr. Div. Agrost. Bull. **18**: 19. 1899.
TYPE LOCALITY: "High mountains, Skamania County, Wash." Collected by Suksdorf.
RANGE: Mountains of Washington.
SPECIMENS EXAMINED: Olympic Mountains, *Elmer* 1903; Skamania County, *Suksdorf* 224.
ZONAL DISTRIBUTION: Arctic?

11. **Sitanion rubescens** Piper, Bull. Torr. Club **30**: 234. 1903.
TYPE LOCALITY: "Dry rocky places, 2,300 m. altitude, Mount Rainier, Washington." Collected by Piper.
SPECIMENS EXAMINED: Mount Rainier, *Piper* 1954.
ZONAL DISTRIBUTION: Arctic.

MUNROA SQUARROSA Torr. and BOUTELOUA OLIGOSTACHYA Torr. are included in Suksdorf's list. There is no direct evidence that either of these occurs in the State.

CYPERACEAE. SEDGE FAMILY.

Flowers monoecious; akene inclosed in a sac-like structure (perigynium) .... **CAREX (p. 161).**
Flowers perfect; spikelets all alike.
  Spikelets flattened, the scales 2-ranked.
    Perianth-bristles none; inflorescence terminal .... **CYPERUS (p. 155).**
    Perianth-bristles 6 to 9; inflorescence axillary .... **DULICHIUM (p. 156).**

Spikelets cylindric, the scales spirally arranged.
  Style not enlarged at base.
    Annuals; perianth bristles none .... Hemicarpha (p. 159).
    Perennials; perianth bristles present.
      Bristles short; barbed .... Scirpus (p. 156).
      Bristles long and silky, smooth .... Eriophorum (p. 158).
  Style enlarged at base.
    Spikelets solitary on a scape .... Eleocharis (p. 159).
    Spikelets not solitary; stems leafy .... Rhynchospora (p. 161).

CYPERUS.

Rachis not winged; annuals.
  Scales tipped with recurved awns .... 1. *C. inflexus.*
  Scales acuminate, not awned .... 2. *C. acuminatus.*
Rachis winged.
  Wing of the rachis separating from it as scales; annual .... 3. *C. erythrorhizos.*
  Wing of the rachis persistent.
    Perennial with corm-like tubers .... 4. *C. strigosus.*
    Perennial by rootstocks bearing nut-like tubers .... 5. *C. esculentus.*

1. **Cyperus inflexus** Muhl. Gram. 16. 1817.
Cyperus aristatus Rottb. err. det. Boeckl. Linnaea **35**: 500. 1868
Type locality: Pennsylvania.
Range: British Columbia to Vermont, south to Mexico and Florida.
Specimens examined: West Klickitat County, *Suksdorf* 81; Kalama, *Piper*, October 31, 1901; Cascade Mountains, *Tweedy* 38; Parker, *Dunn*, August 8, 1901; Lake Chelan, *Elmer* in 1897; Yakima, *Henderson*, October, 1892; Spokane, *Henderson*, July, 1892; Almota, *Piper*, September, 1896, August, 1894; Wawawai, *Piper*, August 24, 1894; without locality, *Elmer* 1069; Pullman, *Piper*, July, 1894; without locality, *Lake & Hull* 369; Mission, *Kreager* 493; Toppenish, *Cotton* 803; Prosser, *Cotton* 644.
Zonal distribution: Upper Sonoran and Arid Transition.

2. **Cyperus acuminatus** Torr. & Hook. Ann. Lyc. N. Y. **3**: 435. 1836.
Type locality: "Near St. Louis, Missouri."
Range: Washington to Illinois, south to California and Texas.
Specimens examined: Almota, *Piper*, August 26, 1894.
Zonal distribution: Upper Sonoran.

3. **Cyperus erythrorhizos** Muhl. Gram. 20. 1817.
Cyperus occidentalis Torr. Ann. Lyc. N. Y. **3**: 259. 1836.
Cyperus cupreus Presl, Rel. Haenk. **1**: 172. 1828.
Type locality: Pennsylvania.
Range: Washington to Massachusetts, south to Florida and California.
Specimens examined: West Klickitat County, *Suksdorf* 221, 222, 587; Parker, *Dunn*, August 8, 1901; Almota, *Piper*, 1937; Vancouver, *Sheldon*, 11274.
Zonal distribution: Upper Sonoran.

4. **Cyperus strigosus** L. Sp. Pl. **1**: 47. 1753.
Type locality: "Habitat in paludibus Jamaicae, Virginiae."
Range: Washington to Maine, south to Texas and Florida.
Specimens examined: West Klickitat County, *Suksdorf* 1261, 84, September 15, 1886. This was listed by Suksdorf as "*C. incompletus* Link?"

5. **Cyperus esculentus** L. Sp. Pl. **1**: 45. 1735. Nut grass.
Cyperus phymatodes Muhl. Gram. 23. 1817.
Type locality: "Habitat Monspelii, inque Italia, Oriente."

Range: Washington to New Brunswick, south to California and Florida.
Specimens examined: West Klickitat County, *Suksdorf* 223; Almota, *Piper* 2651.
Zonal distribution: Upper Sonoran.

DULICHIUM.

1. **Dulichium arundinaceum** (L.) Britton, Bull. Torr. Club **21**: 29. 1894.
Cyperus arundinaceus L. Sp. Pl. **1**: 44. 1753.
Schoenus spathaceus L. Sp. Pl. ed. 2. **1**: 63. 1762.
Cyperus spathaceus L. Syst. ed. 12. **2**: 735. 1767.
Dulichium spathaceum Pers. Syn. **1**: 65. 1805.
Type locality: "Habitat in Virginia."
Range: British Columbia to Nova Scotia, south to Oregon, Texas, and Florida.
Specimens examined: Seattle, *Piper* 692; Lakeview, *Flett*, September 20, 1899.
Zonal distribution: Humid Transition.

SCIRPUS.

- Spikelets solitary, terminal.
  - Involucral bract present, not longer than the spikelet.
    - Perianth bristles none .... 1. *S. riparius.*
    - Perianth bristles 6, smooth .... 2. *S. cespitosus.*
  - Involucral bract 2 to 3 times as long as the spikelet .... 3. *S. subterminalis.*
  - Involucral bract wanting .... 4. *S. pauciflorus.*
- Spikelets several to many, rarely solitary.
  - Stems terete.
    - Inflorescence apparently lateral, sessile .... 5. *S. nevadensis.*
    - Inflorescence umbellate.
      - Akenes 2 mm. long, the scales little longer............ 6. *S. validus.*
      - Akenes 2.5 to 3 mm. long, the scales one-fourth longer. 7. *S. occidentalis.*
  - Stems three-angled.
    - Involucral leaf solitary .... 8. *S. americanus.*
    - Involucral leaves several.
      - Spikelets 1 to 2 cm. long.
        - Akenes oblong-obovate, pale..................... 9. *S. brittonianus.*
        - Akenes orbicular-obovate, dark .... 10. *S. robustus.*
      - Spikelets 3 to 5 mm. long.
        - Akenes 3-angled; bristles 6 .... 11. *S. atrovirens.*
        - Akenes plano-convex; bristles 4.................. 12. *S. microcarpus.*

1. **Scirpus riparius** (R. Br.) Spreng. Syst. **1**: 208. 1825.
Isolepis riparia R. Br. Prod. Fl. Nov. Hol. 222. 1810.
Type locality: Port Jackson, Australia.
Range: Washington to California. South America. Australia. Africa.
Specimens examined: Whidby Island, *Gardner* 318; Seattle, *Piper* 2860.
Zonal distribution: Humid Transition.

2. **Scirpus cespitosus** L. Sp. Pl. **1**: 48. 1753.
Type locality: Europe.
Range: Alaska to Greenland, south to Washington, Colorado, and New York.
Specimens examined: Olympic Mountains, *Piper* 2248; Skamania County, *Suksdorf* 2241; Cascade Mountains, 49°, *Lyall* in 1860; Stevens Pass, *Sandberg & Leiberg* 775; Bridge Creek, *Elmer* 644; Granville, *Conard* 376.
Zonal distribution: Arctic.

3. **Scirpus subterminalis** Torr. Fl. U. S. 1: 47. 1824.

Type locality: Near Deerfield, Massachusetts.

Range: Washington to New Brunswick, south to Pennsylvania.

Specimens examined: Mount Adams, *Howell*, August, 1882; Falcon Valley, *Suksdorf* 88.

4. **Scirpus pauciflorus** Lightf. Fl. Scot. 2: 1078. 1777.

Eleocharis pauciflora Link, Hort. Berol. 1: 284. 1827.

Type locality: Highlands of Scotland, "as upon Malgbyrdy in Breadalbane."

Range: British Columbia to Labrador, south to Washington, Colorado, and New York.

Specimens examined: Mount Adams, *Suksdorf* 90; Alkali Lake, *Sandberg & Leiberg* 416.

5. **Scirpus nevadensis** S. Wats. Bot. King Explor. 360. 1871.

Type locality: "Shore of Soda Lake in Carson Desert, Nevada."

Range: Washington to Nevada.

Specimens examined: Crab and Wilson creeks, *Lake & Hull* 364; *Sandberg & Leiberg* 266; Condons Ferry, *Griffiths & Cotton* 416.

Zonal distribution: Upper Sonoran.

6. **Scirpus validus** Vahl, Enum. Pl. 2: 268. 1806.

Type locality: "Habitat in Carabeis."

Range: Washington to Nova Scotia, southward to California, Texas, and the West Indies.

Specimens examined: Waitsburg, *Horner*, 512; Wenache, *Whited* 584.

Zonal distribution: Arid Transition.

7. **Scirpus occidentalis** (S. Wats.) Chase, Rhodora 6: 68. 1904. Tule.

Scirpus lacustris occidentalis S. Wats. Bot. Cal. 2: 218. 1876.

Type locality: San Diego County, California.

Range: British Columbia to California, eastward to New England.

Specimens examined: Seattle, *Smith* 1012; Falcon Valley, *Suksdorf* 85; North Yakima, *Henderson*, May, 1892; Cascade Mountains, *Tweedy* 2; Cascade Mountains to Colville, *Lyall* in 1860; Alma, *Elmer* 539; Douglas County, *Lake & Hull* 394; Davis Lake, *Kreager* 435; Toppenish, *Cotton* 773; Priest Rapids, *Cotton* 1400.

Zonal distribution: Transition and Upper Sonoran.

8. **Scirpus americanus** Pers. Syn. 1: 68. 1805 (March).

Scirpus pungens Vahl, Enum. 2: 255. 1805 (October).

Type locality: "Hab. in Carolina inferiore."

Range: Throughout North America. Chile.

Specimens examined: Whidby Island, *Gardner* 305; Tacoma, *Flett*, September, 1896; Westport, *Henderson* in 1892; Alma, *Elmer* 533; Crab and Wilson creeks, *Sandberg & Leiberg* 332, 324; Wilson Creek, *Sandberg & Leiberg*, July, 1893; Medical Lake, *Sandberg & Leiberg* 55; Waitsburg, *Horner* 207; Tacoma, *Flett* 2235; Stuart Island, *Laurence* 35.

Zonal distribution: Transition.

9. **Scirpus brittonianus** nom. nov.

Scirpus campestris Britton, Ill. Fl. 1: 267. 1896, not Roth. 1800.

Scirpus robustus campestris Fernald, Rhodora 2: 241. 1900.

Type locality: "Manitoba and Minnesota to Nebraska, Kansas, and Mexico, west to Nevada."

Range: Washington to Manitoba, south to Mexico.

Specimens examined: Wilson Creek, *Sandberg & Leiberg* 333; Satus, *Elmer* 1067; Black Rock Spring, *Suksdorf* 465.

Zonal distribution: Upper Sonoran.

10. **Scirpus robustus** Pursh, Fl. 1: 56. 1814.

Type locality: "In salt marshes and on the banks of rivers, common" in the Atlantic States.

RANGE: Nova Scotia to Texas along the coast. Washington.

SPECIMENS EXAMINED: Seattle, *Piper* 1008; Clallam County, *Elmer* 2725; Admiralty Head, *O. Piper*, May 27, 1898.

ZONAL DISTRIBUTION: Humid Transition.

11. **Scirpus atrovirens** Willd. Enum. Hort. Berol. 79. 1809.

TYPE LOCALITY: "Habitat in America boreali."

RANGE: Washington to Labrador south to Georgia.

SPECIMENS EXAMINED: Waitsburg, *Piper*, July, 1896; *Horner* 19.

ZONAL DISTRIBUTION: Arid Transition.

12. **Scirpus microcarpus** Presl, Rel. Haenk. **1**: 195. 1828.

Scirpus lenticularis Torr. Ann. Lyc. N. Y. **3**: 328. 1836.

Scirpus sylvaticus digynus Boeckl. Linnaea **36**: 727. 1870.

TYPE LOCALITY: Nootka Sound, Vancouver Island.

RANGE: Alaska to Nova Scotia, south to California and New York.

SPECIMENS EXAMINED: Whidby Island, *Gardner* 307; Seattle, *Piper*, June, 1891; Tacoma, *Flett* 206; Falcon Valley, *Suksdorf* 1267; Ellensburg, *Whited*, July, 1898; Egbert Springs, *Sandberg & Leiberg* 387; Railroad Creek, *Elmer*, September, 1897; Pend Oreille River, *Lyall* in 1860; Spokane, *Piper*; Pullman, *Piper*, July 15, 1901; Clallam County, *Elmer* 2723; Mount Carlton, *Kreager* 298; Wenache Mountains, *Whited* 1366; Stehekin, *Griffiths & Cotton* 227; Squaw Creek, *Cotton* 879.

ZONAL DISTRIBUTION: Transition.

13. **Scirpus nanus** Spreng. Pug. **1**: 4. 1815.

Eleocharis pygmaea Torr. Ann. Lyc. N. Y. **3**: 313. 1836.

What is probably this species occurs on flat shores at the mouths of streams near Seattle and elsewhere, but it is apparently always sterile. The presence of the characteristic nodules on the roots seems to justify this determination.

ERIOPHORUM. COTTON GRASS.

Spike solitary; bristles coppery .... 1. *E. chamissonis.*
Spikes several; bristles white.
  Akene obovoid, obtuse; leaves flat, 3 to 8 mm. wide .... 2. *E. polystachyon.*
  Akene oblong, acute; leaves 3-sided, 2 to 4 mm. wide .... 3. *E. gracile.*

1. **Eriophorum chamissonis** C. A. Meyer in Ledeb. Fl. Alt. **1**: 70. 1829.

Eriophorum russeolum Fries, Novit. Mont. **3**: 170. 1842.

TYPE LOCALITY: Unalaska.

RANGE: British Columbia to Washington, Newfoundland to Quebec. Europe.

SPECIMENS EXAMINED: Whidby Island, *Gardner* 311; Seattle, *Piper* 684; Tacoma, *Flett* 207; Olympia, *Henderson*, May, 1892; Ilwaco, *Henderson*, August, 1886; Weiser Lake, *Suksdorf*, July 21, 1890; Tacoma, *Flett* 2227; Ilwaco, *Piper* 4953.

ZONAL DISTRIBUTION: Humid Transition.

The "*E. vaginatum* L." of Suksdorf's list is based on an erroneous determination of the above species.

2. **Eriophorum polystachion** L. Sp. Pl. **1**: 52. 1753.

TYPE LOCALITY: European.

RANGE: Alaska to Labrador south to Oregon and Georgia. Europe. Asia.

SPECIMENS EXAMINED: Mount Rainier, *Piper* 1016, 2174; Mount Adams, *Suksdorf* 89; Cascades 490, *Lyall* in 1860; *Tweedy* 41; Stevens Pass, *Sandberg & Leiberg* 789.

ZONAL DISTRIBUTION: Arctic.

3. **Eriophorum gracile** Roth, Cat. Bot. **2**: 259. 1800.

TYPE LOCALITY: Europe.

Range: Washington to Newfoundland, south to California and Pennsylvania. Europe. Asia.

Specimens examined: Seattle, *Piper* 776; Mount Adams, *Henderson*, July, 1892; Mount Stuart, *Elmer* 1138; Seattle, *Smith* 1016; Coulee City, *Piper* 3857; Priest Rapids, *Cotton* 1380.

Zonal distribution: Upper Sonoran to Hudsonian.

HEMICARPHA.

Scales erect or spreading only at the tips, little exceeding the akenes... 1. *H. micrantha.*
Scales spreading, 2 to 3 times as long as the akenes.
Akenes black; scales broad, abruptly acuminate .... 2. *H. aristulata.*
Akenes brown; scales narrow, gradually attenuate .... 3. *H. occidentalis.*

1. **Hemicarpha micrantha** (Vahl) Britton, Bull. Torr. Club **15**: 104. 1888.
Hemicarpha subsquarrosa Nees; Mart. Fl. Brasil 2^1: 61. 1842.
Scirpus micrantha Vahl, Enum. **2**: 254. 1805.
Type locality: "Habitat in America meridionali?"
Range: Washington to New England and south into South America.
Specimens examined: Falcon Valley, *Suksdorf* 811, 88.

2. **Hemicarpha aristulata** (Coville) A. Nelson, Bull. Torr. Club **29**: 400. 1902.
Hemicarpha micrantha aristulata Coville, Bull. Torr. Club **21**: 36. 1894.
Hemicarpha intermedia Piper, Fl. Palouse Reg. 36. 1901.
Type locality: Texas.
Range: Washington to Texas.
Specimens examined: Almota, *Piper* 2375.

3. **Hemicarpha occidentalis** A. Gray, Proc. Am. Acad. **7**: 391. 1868.
Type locality: Yosemite Valley, California.
Range: Washington to California.
Specimens examined: Falcon Valley, *Suksdorf* 87.

ELEOCHARIS. Spike rush.

Styles 2-cleft; akenes biconvex.
Tubercles constricted basally.
Annual, roots fibrous; akenes black .... 1. *E. capitata.*
Perennial with rootstocks; akenes brown .... 2. *E. palustris.*
Tubercles not constricted basally; annuals.
Heads ovoid; bristles longer than the akenes .... 3. *E. obtusa.*
Heads oblong; bristles not longer than the akenes .... 4. *E. monticola.*
Styles 3-cleft; akenes 3-angled.
Tubercles broad and short; akenes ribbed .... 5. *E. acicularis.*
Tubercles subulate; akenes smooth .... 6. *E. rostellata.*

1. **Eleocharis capitata** (L.) R. Br. Prodr. Fl. Nov. Holl. **1**: 225. 1810.
Scirpus capitatus L. Sp. Pl. **1**: 48. 1753.
Type locality: "Habitat in Virginia."
Range: Washington to Maryland and Florida.
Specimens examined: Lake Chelan, *Lake & Hull*, August, 1892.

2. **Eleocharis palustris** (L.) Roem. & Schult. Syst. **2**: 151. 1817.
Scirpus palustris L. Sp. Pl. **1**: 47. 1753.
Type locality: European.
Range: Subarctic and Temperate North America. Europe. Asia.
Specimens examined: West Seattle, *Piper*, May, 1891; *Smith* 1006; Seattle, *Smith*,

July, 1889; west Klickitat County, *Suksdorf* 90; Kittitas County, *Sandberg & Leiberg* 705; Ellensburg, *Whited*, July, 1897; Wenache, *Whited* 82; Westport, *Henderson*, June, 1892; *Lamb* 1103; Crab and Wilson creeks, *Sandberg & Leiberg* 323; Pend Oreille River, *Lyall* in 1861; Pullman, *Elmer* 295; Clallam County, *Elmer* 2724; Lake Kalispel, *Kreager*, 333, 444; Newport, *Kreager*, 453, Mount Carlton, *Kreager*, 289; Grand Coulee, *Griffiths & Cotton*, 452; Cow Creek, *Griffiths & Cotton*, 502, 523; Cow Creek to Ephrata, *Griffiths & Cotton*, 466; Prosser, *Cotton* 660; Toppenish, *Cotton* 788.

Zonal distribution: Transition and Upper Sonoran.

A variable species which has been much subdivided by European authors. Our form was referred to *E. multicaulis* Smith in Hooker's Flora.

3. **Eleocharis obtusa** Schultes. Mant. **2**: 89. 1824.

Scirpus obtusus Willd. Enum. Hort. Berol 76. 1809.

Type locality: "Habitat in America boreali."

Range: British Columbia to New Brunswick, south to Kansas and the Gulf of Mexico.

Specimens examined: Near Montesano, *Heller* 4073; *Henderson*, June, 1892; Seattle, *Piper* 661; Vancouver Lake, *Suksdorf* 2328; Manor, *Piper* 3076; Almota, *Piper*, July, 1897; Eastern Washington, *Lake & Hull* 361; Green River Hot Springs, *Piper* 6280; Waitsburg, *Horner* 14.

Zonal distribution: Humid Transition.

3a. **Eleocharis obtusa gigantea** Fernald, Proc. Am. Acad. **34**: 493, 1899.

Type locality: Cascade Mountains, latitude 49°. Collected by Lyall.

Range: British Columbia to Oregon.

Specimens examined: Cascade Mountains, latitude 49°, *Lyall* in 1859.

4. **Eleocharis monticola** Fernald, Proc. Am. Acad. **34**: 496. 1899.

Type locality: Plumas County, California.

Range: Washington to California.

Specimens examined: Parker, *A. D. Dunn*, August 8, 1901; Bingen, *Suksdorf* 2583.

4a. **Eleocharis monticola leviseta** Fernald, Proc. Am. Acad. **34**: 496. 1899.

Type locality: Cœur d'Alene River, Kootenai County, Idaho.

Range: Washington and Idaho.

Specimens examined: Lake Kalispel, *Kreager* 332a, 332b.

5. **Eleocharis acicularis** (L.) Roem. & Schult. Syst. **2**: 154. 1817.

Scirpus acicularis L. Sp. Pl. **1**: 48. 1753.

Type locality: Europe.

Range: Temperate North America. Europe. Asia.

Specimens examined: Seattle, *Smith* 662; west Klickitat County, *Suksdorf* 225; Wilson Creek, *Lake & Hull* 388; Pend Oreille River, *Lyall* in 1861, Pullman, *Piper* 1938, August, 1893; Lake Kalispel, *Kreager* 331.

Zonal distribution: Transition.

5a. **Eleocharis acicularis bella** Piper, Fl. Palouse Reg. 35. 1901.

Type locality: Pullman, Washington.

Range: Washington.

Specimens examined: West Klickitat County, *Suksdorf* 226; Cascade Mountains, *Tweedy* 42; Spokane, *Piper* 2642; Pullman, *Piper* 3055; without locality, *Vasey* in 1889.

6. **Eleocharis rostellata** Torr. Fl. N. Y. **2**: 347. 1843.

Scirpus rostellatus Torr. Ann. Lyc. N. Y. **3**: 318. 1836.

Type locality: Penn Yan, New York.

Range: British Columbia to New England, south to California and Florida.

Specimens examined: Skamania County, *Suksdorf* 2237; Falcon Valley, *Suksdorf* 2820, 2537.

RHYNCHOSPORA.

1. **Rhynchospora alba** (L.) Vahl, Enum. 2: 236. 1806.

Schoenus albus L. Sp. Pl. 1: 44. 1753.

Type locality: Europe.

Range: Alaska to Labrador, south to Oregon and Florida.

Specimens examined: Whatcom County, *Suksdorf* 1014; Seattle, *Piper* 1121; Granville, *Conard* 374.

Zonal distribution: Humid Transition.

CAREX. Sedge.

1. **Carex ablata** Bailey, Bot. Gaz. **13**: 82. 1888.

Carex frigida of American authors.

Type locality: None cited.

Range: British Columbia to Utah and California.

Specimens examined: Olympic Mountains, *Piper* 2244; *Flett* 823; Clallam County, *Elmer* 2703; Mount Rainier, *Allen* 270; *Piper* 2546; Mount Stuart, *Elmer* 1136, 1127; Mount Adams, *Suksdorf* 25, 26; *Henderson*, August 8, 1892; Stevens Pass, *Sandberg & Leiberg* 707; Cascade Mountains, *Tweedy*.

Zonal distribution: Arctic.

2. **Carex accedens** Holm, Am. Journ. Sci. IV. **16**: 457. 1903.

Carex spreta Bailey, Mem. Torr. Club **1**: 6. 1889, not *C. spreta* Steud.

Carex stylosa virens Bailey, Proc. Am. Acad. **22**: 79. 1886, not *Carex virens* Lam. 1789.

Type locality: Sauvies Island, Oregon. Collected by Howell.

Range: Oregon and Washington.

Specimens examined: Mount Rainier, *Piper* 2550; Mount Adams, *Howell*, August, 1882; without locality, *Vasey* in 1889.

Zonal distribution: Transition to Arctic.

3. **Carex acutina tenuior** Bailey, Mem. Torr. Club **1**: 53. 1889.

Type locality: Oregon. Collected by Howell.

Range: Washington and Oregon.

Specimens examined: Mount Adams, *Henderson* 1489 (fide Bailey).

4. **Carex amplifolia** Boott in Hook. Fl. Bor. Am. **2**: 228. *t. 226.* 1839.

Type locality: "Marshy places, Columbia River." Collected by Douglas.

Range: British Columbia to Idaho and California.

Specimens examined: Olympic Mountains, *Grant* in 1889; Seattle, *Piper* 995; upper Nisqually Valley, *Allen* 174; Mount Adams, *Suksdorf* 50; Cascade Mountains, latitude 49°, *Lyall* in 1859; Cascade Mountains, *Henderson*, July, 1892; Ellensburg, *Elmer* 422; Tampico, *Henderson*, July, 1892; Falcon Valley, *Suksdorf* 42; without locality, *Vasey* in 1889; Clarks Springs, *Kreager* 26; Klickitat River, *Cotton* 1443.

Zonal distribution: Transition.

5. **Carex aperta** Boott in Hook. Fl. Bor. Am. **2**: 218. *t. 219.* 1839.

Carex turgidula Bailey, Bot. Gaz. **25**: 271. 1898.

Type locality: "Columbia River." Collected by Douglas and Scouler.

Range: Oregon, Washington, and Idaho.

Specimens examined: Columbia River, *Scouler*; west Klickitat County, *Suksdorf* 22, 64, 65, 66; Pend Oreille River, *Lyall* in 1861; McAllister Lake, *Henderson* 1788; Palouse, *Henderson* 2088; Meyers Falls, *Kreager* 588; Kalispel Valley, *Spillman*, July 1, 1901.

Zonal distribution: Transition.

This species has been considered the same as *C. prolixa* Fries of Europe, *C. acuta prolixa* Hornem.

6. **Carex aquatilis** Wahl. Kongl. Vet. Akad. Handl. II. **24**: 165. 1803.

TYPE LOCALITY: "Hab. intra ripas fluviorum per Lapponiam."

RANGE: Washington to New England, south to Colorado.

SPECIMENS EXAMINED: Ione, *Kreager* 426.

7. **Carex arcta** Boott, Ill. 155. *t.* 497. 1867.

Carex canescens oregana Bailey, Mem. Torr. Club **1**: 75. 1889.

TYPE LOCALITY: "In America boreali, Canada, Lake Superior, Rainy Lake, Lake of the Woods."

RANGE: British Columbia to Quebec, south to Oregon and Vermont.

SPECIMENS EXAMINED: Seattle, *Piper* 997; *Henderson* 2074; Mount Rainier, *Allen* 271; Mount Adams, *Suksdorf* 2063, 11; Tacoma, *Flett* 13; Chambers Lake, *Henderson*, August 23, 1892; Palouse, *Henderson* 2060; Falcon Valley, *Suksdorf* 902; Usk, *Kreager*, August 11, 1902; without locality, *Vasey* in 1889; Clealum, *Cotton* 845; Toppenish, *Henderson*, May 28, 1892.

ZONAL DISTRIBUTION: Transition.

8. **Carex aristata** R. Br. in Richards. Bot. App. Frankl. Journ. 751. 1823.

TYPE LOCALITY: British America.

RANGE: British Columbia to Saskatchewan, south to Oregon, Utah, and New York.

SPECIMENS EXAMINED: Conconully, *Griffiths & Cotton* 310; Spangle, *Suksdorf* 2600; Phileo Lake, *Suksdorf* 2599.

ZONAL DISTRIBUTION: Arid Transition.

9. **Carex athrostachya** Olney, Proc. Am. Acad. **7**: 393. 1868.

TYPE LOCALITY: Yosemite Valley, California.

RANGE: Washington to California and Colorado.

SPECIMENS EXAMINED: Cascade Mountains, *Tweedy* 9; Ellensburg, *Piper*, July, 1897; *Whited* 557; North Yakima, *Henderson* 2066; Easton, *Henderson* in 1892; Lake Chelan, *Lake & Hull* 416; Spokane, *Henderson* in 1892; Marshall Junction, *Piper* 2278; Palouse City, *Henderson*, July, 1892; Union Flat, *Henderson* in 1892; Pullman, *Elmer* 873; *Piper*, August, 1893; Kittitas Valley, *Cotton* 1215.

ZONAL DISTRIBUTION: Arid Transition.

10. **Carex atrata** L. Sp. Pl. **2**: 976. 1753.

TYPE LOCALITY: "In Alpibus Europae."

RANGE: Arctic regions south to Oregon and Colorado. Europe.

SPECIMENS EXAMINED: Mount Rainier, *Allen*, August 14, 1895; Mount Adams, *Flett* 1402.

ZONAL DISTRIBUTION: Arctic.

10a. **Carex atrata nigra** (All.) Gaudin, Agrost. Helvet. 115. 1811.

Carex nigra All. Fl. Pedem. **2**: 267. 1775.

TYPE LOCALITY: "In summis alpibus Pedemontii et Sabaudiae."

RANGE: Washington to Colorado. Europe.

SPECIMENS EXAMINED: Mount Stuart, *Elmer* 1124, 1125.

11. **Carex aurea** Nutt. Gen. **2**: 205. 1818.

TYPE LOCALITY: Shores of Lake Michigan.

RANGE: Subarctic regions southward to California, Colorado, and the Great Lakes.

SPECIMENS EXAMINED: Clallam County, *Elmer* 2712; Port Ludlow, *Binns* in 1890; Coupeville, *Gardner* 303; Klickitat River, *Flett* 1363; Falcon Valley, *Suksdorf* 35; Rattlesnake Mountains, *Cotton* 709; Conconully, *Griffiths & Cotton* 277; Lake Omack, *Griffiths & Cotton* 400; Mount Stuart, *Elmer* 1141; Wilbur, *Henderson*, July, 1892; Union Flat, *Hull*, July, 1892; Pullman, *Piper*, May, 1892; Meyers Falls, *Kreager* 591; Klickitat River, *Cotton* 1452.

ZONAL DISTRIBUTION: Transition.

11a. Carex aurea celsa Bailey, Mem. Torr. Club **1**: 75. 1889.
Type locality: "San Bernardino Mts., California."
Range: Washington to California.
Specimens examined: Vancouver, *Piper* 6440.
Zonal distribution: Transition.

12. Carex bebbii (Bailey) Olney; Fernald, Proc. Am. Acad. **37**: 478. 1902.
Carex tribuloides bebbii Bailey, Mem. Torr. Club **1**: 55. 1889.
Type locality: None given.
Range: British Columbia and Washington to Newfoundland and New York.
Specimens examined: Clarks Springs, *Kreager* 84; Silver Lake, *Henderson* 2072; Loon Lake, *Beattie & Chapman* 2186.
Zonal distribution: Arid Transition.

13. Carex bolanderi Olney, Proc. Am. Acad. **7**: 393. 1868.
Carex deweyana bolanderi W. Boott in S. Wats. Bot. Cal. **2**: 236. 1876.
Type locality: "California, Yosemite Valley and Mariposa Big-tree grove."
Range: British Columbia to Idaho and California.
Specimens examined: Clallam County, *Elmer* 2716, 2715; Seattle, *Piper* 1001; Mount Stuart, *Elmer* 1142; along Salmon River, *Horner* 485; Stehekin, *Griffiths & Cotton* 198, 246; Blue Mountains, *Piper*, July, 1896; *Lake & Hull* 372; without locality, *Brandegee* 1138.
Zonal distribution: Transition.
The specimen referred to *C. bromoides* Schk. in Cooper's report is undoubtedly *C. bolanderi.*

14. Carex brunnescens (Pers.) Poir. Suppl. **3**: 286. 1813.
Carex curta brunnescens Pers. Syn. **2**: 539. 1807.
Carex canescens alpicola Wahl. Fl. Lapp. 232. 1812.
Carex canescens vulgaris Bailey, Bot. Gaz. **13**: 86. 1888.
Type locality: "Hab. in Monte Touly."
Range: Newfoundland to British Columbia, south to Washington, Michigan, and in the mountains to North Carolina. Europe.
Specimens examined: Goose Lake, Skamania County, *Flett* 1379; Mount Rainier, *Piper* 2549; Mount Adams, *Suksdorf* 4277.
Zonal distribution: Arctic.

15. Carex canescens L. Sp. Pl. **2**: 974. 1753.
Type locality: Europe.
Range: Alaska to Labrador, south to Washington, Utah, and Vermont.
Specimens examined: Seattle, *Piper* 1106; Nisqually Valley, *Allen* 163; Mount Adams, *Henderson* 2068.

15a. Carex canescens subloliacea Laestad. Nov. Act. Soc. Sci. Ups. **11**: 282. 1839.
Type locality: Lapland.
Range: Subarctic America, south to Washington, Michigan, and New York.
Specimens examined: Seattle, *Piper* 1106.

16. Carex chalciolepis Holm, Am. Journ. Sci. IV. **16**: 28. 1903.
Type locality: Pagosa Peak, Colorado.
Range: Washington to Colorado.
Specimens examined: Mount Adams, *Suksdorf* 4364, 2896; *Henderson* 2106.
Zonal distribution: Arctic.

17. Carex circinata C. A. Meyer, Mem. Sav. Etr. Petersb. **1**: 209. *t. 6.* 1831.
Type locality: Unalaska.
Range: Alaska to Washington.
Specimens examined: Olympic Mountains, *Elmer* 2721.
Zonal distribution: Arctic.

18. Carex comosa Boott, Trans. Linn. Soc. **20**: 117. 1846.

Carex pseudo-cyperus americanus Hochst.; Bailey, Mem. Torr. Club **1**: 54. 1889.

Type locality: "In Georgia et Carolina."

Range: Washington to Nova Scotia, south to California and Georgia.

Specimens examined: Whatcom County, *Suksdorf* 1018; Seattle, *Piper* 992; Waitsburg, *Horner*, July, 1898; near Touchet River, *Horner* 586.

Zonal distribution: Transition.

19. Carex cryptocarpa C. A. Meyer, Mem. Sav. Etr. Petersb. **1**: 226. *t. 14*. 1831.

Carex scouleri Torr. Ann. Lyc. N. Y. **3**: 399. 1836.

Type locality: "Habitat in Unalaschka et Kamtschatca."

Range: Alaska to Oregon.

Specimens examined: Seattle, *Piper* 990; *Smith* 1005; Tacoma, *Flett* 134; Ilwaco, *Henderson*, September, 1892; without locality, *Cooper* in 1854; Ilwaco, *Piper* 6446; Clallam County, *Elmer* 2719.

Zonal distribution: Humid transition.

The Tolmie specimen from Hood Canal referred by Boott [a] to *C. salina* Wahl. is with little doubt the above species.

20. Carex deflexa Hornem. Plantel. ed. 3. **1**: 938. 1821.

Type locality: Not ascertained.

Range: Alaska to Greenland, south to Oregon, Michigan, and New England.

Specimens examined: Mount Rainier, *Piper* 2552; Wenache region, *Brandegee* 1145.

21. Carex deweyana Schwein. Ann. Lyc. N. Y. **1**: 65. 1824.

Type locality: "New Eng."

Range: British Columbia to Nova Scotia, south to New Mexico, Michigan, and Pennsylvania.

Specimens examined: West Klickitat County, *Suksdorf* 31; Peshastin, *Sandberg & Leiberg* 508.

Zonal distribution: Transition.

22. Carex dives Holm, Am. Journ. Sci. IV. **18**: 19. 1904.

Type locality: Chilliwack Valley, British Columbia.

Range: British Columbia to Oregon.

Specimens examined: Nisqually, *Wilkes Expedition* 308; Trout Lake, *Suksdorf* 43, 44; Cascade Mountains, *Suksdorf* 41.

Zonal distribution: Humid Transition.

These specimens have been supposed to represent *C. barbarae* Dewey, and may prove to belong there. Suksdorf's No. 41 was labelled *C. aquatilis* Wahl., and is perhaps the basis for the inclusion of that name in his list of Washington plants.

23. Carex douglasii Boott in Hook. Fl. Bor. Am. **2**: 213. *t. 214*. 1839.

Type locality: "N. W. coast." Collected by Douglas.

Range: British Columbia and Saskatchewan to California and New Mexico.

Specimens examined: Wenache, *Griffiths & Cotton* 135; Rattlesnake Mountains, *Cotton* 572; North Yakima, *Griffiths & Cotton* 65; Brewster, *Griffiths & Cotton* 257; Cow Creek, *Griffiths & Cotton* 505; Ellensburg, *Piper* 2744; Rock Lake, *Sandberg & Leiberg*, May, 1893; Rock Creek, *Sandberg & Leiberg* 79; Ritzville, *Sandberg & Leiberg* 188; Spokane County, *Suksdorf* 80; Pullman, *Piper*, June, 1899.

Zonal distribution: Upper Sonoran and Arid Transition.

24a. Carex festiva horneri nom. nov.

Carex festiva stricta Bailey, Mem Torr. Club **1**: 51. 1889, not *C. stricta* Lam. 1789.

Type locality: California.

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[a] Hook. Fl. Bor. Am. **2**: 219. 1839.

RANGE: Washington to California.

SPECIMENS EXAMINED: Olympic Mountains, *Elmer* 2702; Mount Rainier, *Piper* 2532; Simcoe Mountains, *Suksdorf* 60; west Klickitat County, *Suksdorf* 14; Stevens Pass, *Sandberg & Leiberg* 773; Conconully, *Griffiths & Cotton* 298: Blue Mountains, *Horner*, June 17, 1896, 479; *Piper* 2272.

ZONAL DISTRIBUTION: Hudsonian and Arctic.

24b. Carex festiva pachystachya (Cham.) Bailey, Mem. Torr. Club **1**: 51. 1889.

Carex pachystachya Cham.; Steud. Pl. Glum. **2**: 197. 1855.

TYPE LOCALITY: "In Unalaschka."

RANGE: Alaska to Montana and Oregon.

SPECIMENS EXAMINED: Olympic Mountains, *Elmer* 2709; Montesano, *Heller* 3954; Seattle, *Piper*, June 9, 1884; *Henderson* 2107; Mount Adams, *Henderson*, August 6, 1892; Nisqually Valley, *Allen*, 164; Stevens Pass, *Sandberg & Leiberg* 756; Skamania County, *Flett* 1373; Rattlesnake Mountains, *Cotton* 700; Lake Omach, *Griffiths & Cotton* 402; Wenache, *Whited*, June 28, 1896, 1081; Wenas, *Henderson*, June 18, 1892; Bridge Creek, *Elmer* 815; Stehekin, *Griffiths & Cotton* 245; Salmon River, *Horner* 483; Waitsburg, *Horner* 199; Pullman, *Piper* 1934; Blue Mountains, *Lake & Hull* 371.

ZONAL DISTRIBUTION: Transition.

25. Carex festucacea brevior (Dew.) Fernald, Proc. Am. Acad. **32**: 477. 1902.

Carex straminea brevior Dew. Am. Journ. Sci. **11**: 158. 1826.

TYPE LOCALITY: "Grows with the other [i. e. *C. straminea*] also in Missouri."

RANGE: British Columbia and Washington to New England and Arkansas.

SPECIMENS EXAMINED: West Klickitat County, *Suksdorf* 13, 74, 613; Spokane, *Henderson*, July 10, 1892; Toppenish, *Henderson* 2070; without locality, *Vasey* in 1889.

ZONAL DISTRIBUTION: Arid Transition.

26. Carex feta Bailey, Bull. Torr. Club **20**: 417. 1893.

Carex straminea mixta Bailey, Proc. Am. Acad. **22**: 151. 1886, not *C. mixta* Miégev. 1865.

TYPE LOCALITY: California.

RANGE: Washington to California.

SPECIMENS EXAMINED: Vancouver, *Piper* 6477; Falcon Valley, *Suksdorf* 3103; Husum, *Suksdorf* 3102.

ZONAL DISTRIBUTION: Humid Transition.

The Columbia River specimens referred to *C. lagopodioides* Schk. in Hooker's Flora [a] probably belong to *C. feta*. Suksdorf's record of *C. adusta* Boott is, to judge from a specimen so labeled, likewise *C. feta*.

27. Carex filifolia Nutt. Gen. **2**: 204. 1818.

TYPE LOCALITY: "Dry plains and gravelly hills of the Missouri."

RANGE: British Columbia and Saskatchewan to California and Colorado.

SPECIMENS EXAMINED: Rattlesnake Mountains, *Cotton* 329; Chelan, *Griffiths & Cotton* 249; Fort Colville, *Lyall* in 1861; Rock Lake, *Sandberg & Leiberg*, May, 1893; Rock Creek, *Piper* 2790; *Sandberg & Leiberg* 81; Pullman, *Piper* 1764; *Elmer* 837.

ZONAL DISTRIBUTION: Arid Transition.

28. Carex filiformis L. Sp. Pl. **2**: 916. 1753.

TYPE LOCALITY: European.

RANGE: British Columbia to Labrador, south to Washington and New Jersey.

SPECIMENS EXAMINED: Seattle, *Piper* 1108; Stehekin, *Griffiths & Cotton* 207; Ellensburg, *Piper* 2748.

ZONAL DISTRIBUTION: Transition.

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[a] Hook. Fl. Bor. Am. **2**: 214, 1839.

29. Carex flava recterostrata Bailey, Bot. Gaz. **13** : 84. 1888.

Type locality: Vancouver Island. Collected by Macoun.

Range: British Columbia to Oregon and Idaho.

Specimens examined: Clallam County, *Elmer* 2704; Mount Constitution, *Henderson* 2090; Lake Padden, *Suksdorf* 1017; Loomis, *Elmer* 560; Bridge Creek, *Elmer* 560; Quinault, *Conard* 248; Padden Lake, *Suksdorf* 1017.

Zonal distribution: Transition and Canadian.

30. Carex furva (Bailey).

Carex pratensis furva Bailey; Macoun Cat. Can. Pl. **2** : 377. 1890.

Carex praticola furva Heller, Cat. N. A. Pl. ed. 2. **3**. 1900.

Type locality: "In damp meadows at Cedar Hill, Goldstream, and throughout northern Vancouver Island."

Range: British Columbia and Washington.

Specimens examined: Coupeville, *Gardner* 296.

Zonal distribution: Humid Transition.

31. Carex fusca All. Fl. Ped. **2** : 269. 1785.

Carex buxbaumii Wahl. Kongl. Vet. Akad. Handl. II. **24** : 163. 1803.

Type locality: "Frequens in alpibus, quae monte Vesulo et Cenisio intercipiuntur."

Range: Alaska to Laborador, south to California and Georgia.

Specimens examined: Cascade Mountains, *Tweedy* 4; Lake Keechelus, *Henderson* 2079.

32. Carex gayana Desv. in Gay, Fl. Chil. **6** : 205. 1853.

Type locality: Chile.

Range: Washington to Colorado and California and southward.

Specimens examined: Falcon Valley, *Suksdorf* 2; also May 19 and July, 1884.

Zonal distribution: Arid Transition.

33. Carex geyeri Boott, Trans. Linn. Soc. **20**: 118. 1846.

Type locality: "In declivitatibus aridis Montium Saxosorum, Americae Septentrionalis." Collected by Geyer (No. 332).

Range: British Columbia to Colorado and California.

Specimens examined: Goat Mountains, *Allen* 169; near Ellensburg, *Piper*, May, 1897; Upper Atanum River, *Henderson* 2076; Mount Stuart, *Sandberg & Leiberg* 828; Kamiak Butte, *Piper*, July 20, 1899; without locality, *Geyer* 332.

Zonal distribution: Arid Transition.

34. Carex gymnoclada Holm, Am. Journ. Sci. IV. **14**: 424. 1902.

Type locality: "Eastern Oregon, bogs of Hurricane Creek, 6,000 ft. alt." Collected by Cusick.

Range: Washington and Oregon.

Specimens examined: Mount Adams, *Henderson* 2097; Big Klickitat River, *Henderson*, August 4, 1892; Clallam County, *Elmer* 2708.

Zonal distribution: Arctic.

35. Carex hendersoni Bailey, Proc. Am. Acad. **22**: 115. 1886.

Type locality: Portland, Oregon. Collected by Henderson.

Range: British Columbia to California.

Specimens examined: Seattle, *Piper* 999; Chenowith, *Suksdorf* 2982; Lower Cascades, *Suksdorf* 1904.

Zonal distribution: Humid Transition.

36. Carex hoodii Boott in Hook. Fl. Bor. Am. **2**: 211. *t. 211.* 1839.

Type locality: "Columbia River." Collected by Douglas and by Scouler.

Range: Oregon to Montana and British Columbia.

SPECIMENS EXAMINED: West Klickitat County, *Suksdorf* 71; Easton, *Henderson* 2103; Spokane, *Henderson* 2109; Bingen, *Suksdorf* 4434; without locality, Vasey in 1889; Clark Springs, *Beattie & Chapman* 2044; Coupeville, *Gardner* 309, 310.

ZONAL DISTRIBUTION: Arid Transition.

36a. Carex hoodii neurocarpa nom. nov.

Carex hoodii nervosa Bailey, Mem. Torr. Club 1: 14. 1889, not *C. nervosa* Desf. 1800.

TYPE LOCALITY: "California."

RANGE: California to Washington.

SPECIMENS EXAMINED: None; reported by Bailey from Seattle, *Howell.*

37. Carex hookerana Dewey, Am. Journ. Sci. **29**: 248. 1836.

Carex muricata gracilis Boott, Ill. 193. 1858.

TYPE LOCALITY: "Found at Carlton House by Dr. Richardson."

RANGE: Washington to Saskatchewan, Utah, and California.

SPECIMENS EXAMINED: Bingen, *Suksdorf* 2821.

38. Carex hystricina Willd.; Schkuhr, Riedgr. **2**: 69. 1801.

TYPE LOCALITY: "Habitat in humidis Pensylvaniae."

RANGE: British Columbia to Nova Scotia, south to Oregon, Nebraska, and Georgia.

SPECIMENS EXAMINED: Head of Priest Rapids at "The Junipers," *Cotton* 1379, July 16, 1903.

39. Carex illota Bailey, Mem. Torr. Club **1**: 15. 1889.

Carex bonplandii minor Gray, Proc. Acad. Phila. **1863**: 77. 1863.

TYPE LOCALITY: Colorado.

RANGE: Washington to Colorado and Utah.

SPECIMENS EXAMINED: Olympic Mountains, *Flett* 824; *Elmer* 2703; *Piper* 996; Mount Adams, *Suksdorf* 3, 4; Bridge Creek, *Elmer* 2706; Mount Adams, *Suksdorf* 4251, 4252; Hell Roaring River, *Cotton* 1503.

ZONAL DISTRIBUTION: Arctic.

40. Carex interrupta Boeckl. Linnaea **40**: 432. 1876.

Carex angustata verticillata Boott in Hook. Fl. Bor. Am. **2**: 218. 1839.

Carex verticillata Boott, Ill. 67. *t. 183.* 1858, not *C. verticillata* Zoll. & Moritzski. 1846.

TYPE LOCALITY: Columbia River.

RANGE: Washington, Oregon, and Idaho.

SPECIMENS EXAMINED: West Klickitat County, *Suksdorf* 9; Mount Adams, *Henderson,* August 5, 1892; Quinault, *Conard* 165; Tumwater, *Henderson,* August 2, 1892; without locality, *Vasey* in 1889.

ZONAL DISTRIBUTION: Humid Transition.

41. Carex irrasa Bailey, Bot. Gaz. **25**: 271. 1898.

Carex douglasii laxiflora Bailey, Mem. Torr. Club **2**: 20. 1889, not *C. laxiflora* Lam.

TYPE LOCALITY: "Near Utica, Montana."

RANGE: Washington to Montana.

SPECIMENS EXAMINED: Between Coulee City and Waterville, *Spillman,* May, 1896.

ZONAL DISTRIBUTION: Arid Transition.

42. Carex jonesii Bailey, Mem. Torr. Club **1**: 16. 1889.

TYPE LOCALITY: "Soda Springs, Nevada Co., Cal.; 7,000 feet." Collected by M. E. Jones.

RANGE: California to Washington.

SPECIMENS EXAMINED: Cascade Mountains, *Tweedy* 27; Stevens Pass, *Sandberg & Leiberg* 773.

43. **Carex kelloggii** W. Boott in S. Wats. Bot. Cal. **2**: 240. 1880.

Carex acuta pallida Boott, Ill. 166. 1867, not *C. pallida* Meyer.

Carex vulgaris lipocarpha Holm, Am. Journ. Sci. IV. **17**: 308. 1904.

Carex rigida strictiformis Bailey, err. det. Piper, Fl. Palouse Reg. 38.

TYPE LOCALITY: California, "In the Sierra Nevada at Alta."

RANGE: Alaska to Idaho and California.

SPECIMENS EXAMINED: Olympic Mountains, *Piper* 2245, 985; Seattle, *Piper* 989; Clallam County, *Elmer* 2707; Mount Rainier, *Piper* 2548; *Allen* 267; Lake Keechelus, *Henderson* 2080; Nisqually Valley, *Allen* 167; Wenache River, *Whited*, August 25, 1901; North Yakima, *Henderson* 2083; Clealum Lake, *Cotton* 863; Klickitat River, *Flett* 1415; Cascade Mountains, *Tweedy* 3; Davis Lake, *Kreager* 439; Spokane, *Piper* 2851; Pullman, *Elmer* 881; Mount Adams, *Suksdorf* 19; Klickitat County, *Suksdorf* 18.

ZONAL DISTRIBUTION: Transition mainly.

This is the commonest representative of *C. vulgaris* Fries on the Pacific coast, and it has been mistaken for *C. vulgaris juncella* Fries. Our plant has commonly been called C. *decidua* Boott, a species from Terra del Fuego and the Falkland Islands, but that has conspicuously stipitate perigynia. Specimens from the mouth of the Columbia, Oregon, collected by Hinds and by Henderson have stipitate perigynia and represent either true *C. decidua* or a very closely allied species.

44. **Carex laeviculmis** Meinsch. Bot. Centralb. 55. 1893.

Carex deweyana sparsiflora Bailey, Bot. Gaz. **13**: 87. 1888, not *Carex sparsiflora* Fries.

TYPE LOCALITY: "Kamtschatka, Insel Sitcha."

RANGE: Alaska to Oregon and Idaho.

SPECIMENS EXAMINED: Whatcom County, *Gardner* 414; upper Nisqually Valley, *Piper* 2534; *Allen* 162; Mount Adams, *Henderson*, August 6, 1892; Stevens Pass, *Sandberg & Leiberg* 708; *Piper* 2318; Stampede Tunnel, *Henderson* 2067; Bridge Creek, *Elmer* 685; Mount Carlton, *Kreager* 248; Touchet River, *Horner* 486.

ZONAL DISTRIBUTION: Canadian.

45. **Carex lanuginosa** Michx. Fl. **2**: 175. 1803.

Carex filiformis latifolia Boeckl. Linnaea **41**: 309. 1877.

TYPE LOCALITY: "Ad lacus Mistassins," Canada.

RANGE: British Columbia to Nova Scotia, south to California, New Mexico, and Pennsylvania.

SPECIMENS EXAMINED: North Yakima, *Henderson*, May, 1892; west Klickitat County, *Suksdorf* 51; Satus, *Elmer* 1068; Crab and Wilson creeks, *Sandberg & Leiberg* 322, Coulee City, *Henderson*, July, 1892; Conconully, *Griffiths & Cotton* 274; Brewster, *Griffiths & Cotton*, 261; Cow Creek, *Griffiths & Cotton* 498; Grand Coulee, *Griffiths & Cotton* 444, 468; Wenas, *Griffiths & Cotton* 83; Pullman, *Piper* 3510; Vancouver, *Piper* 6441.

ZONAL DISTRIBUTION: Transition.

46. **Carex lenticularis** Michx. Fl. **2**: 172. 1803.

TYPE LOCALITY: "Per tractus montium, a sinu Hudsonis ad Canadam, praesertim ad lacum Cycnorum dictum."

RANGE: Washington to Labrador and Maine.

SPECIMENS EXAMINED: Sumas Prairie, *Lyall* in 1858; Larm River, *Suksdorf* 40.

ZONAL DISTRIBUTION: Transition.

47. **Carex leporina** L. Sp. Pl. **2**: 973. 1753.

TYPE LOCALITY: "Habitat in Europae pratis udis."

RANGE: Washington and British Columbia; Nova Scotia, New England, and New York. Europe. Asia.

SPECIMENS EXAMINED: Seattle, *Piper* 1003; East Sound, *Henderson* 2074.

48. Carex leptalea Wahl. Kongl. Vet. Akad. Handl. II. **24**: 139. 1803.

Carex polytrichoides Willd. in Wahl. loc. cit. as synonym.

Type locality: "Habitat in Pennsylvania."

Range: Washington to Saskatchewan, south to Florida.

Specimens examined: Clallam County, *Elmer* 2714; Samish Lake, *Suksdorf* 1016; Seattle, *Piper* in 1888; Stampede Pass, *Henderson* 2057; Vancouver, *Piper* 6442.

Zonal distribution: Humid Transition.

49. Carex liddoni Boott in Hook. Fl. Bor. Am. **2**: 214. *t. 215.* 1839.

Type locality: "Columbia River." Collected by Scouler.

Range: Washington to Montana and Colorado.

Specimens examined: Columbia River, *Scouler;* Chelan Butte, *Griffiths & Cotton* 169; Loomis, *Elmer* 577; Spokane County, *Suksdorf* 61; Spangle, *Piper* 3544.

Zonal distribution: Arid Transition.

50. Carex limosa L. Sp. Pl. **2**: 977. 1753.

Type locality: Europe.

Range: Washington to Labrador, south to New Jersey.

Specimens examined: Seattle, *Piper* 1109; upper Nisqually Valley, *Allen* 295; Pend Oreille River, *Lyall* in 1861.

Zonal distribution: Canadian?

51. Carex luzulaefolia W. Boott in Wats. Bot. Cal. **2**: 250. 1876.

Type locality: "In the Sierra Nevada, at high altitudes, from above Yosemite Valley to Ebbett's Pass and northward," California.

Range: Washington to California.

Specimens examined: Mount Adams, *Suksdorf* 26.

This specimen is perhaps only a broad-leaved form of *C. ablata* Bailey.

52. Carex macrocephala Willd.; Spreng. Syst. **3**: 808. 1826.

Type locality: "Sibir.?" Collected by Pallas.

Range: Seashores, Cook Inlet, Alaska, to Oregon.

Specimens examined: Clallam County, *Elmer* 2710; Shoalwater Bay, *Cooper;* Whidby Island, *Gardner* 314; Port Angeles, *Piper* 2306; Grays Harbor, *Wilkes Expedition.*

Zonal distribution: Humid Transition.

53. Carex macrochaeta C. A. Meyer, Mem. Sav. Etr. Petersb. **1**: 224. *t. 13.* 1831.

Type locality: "Habitat in Unalaschka."

Range: Alaska to Oregon.

This species is reported from Fort Vancouver by Hooker Fl. **2**: 219. We have seen no Washington specimens, but the plant is known to occur near Multnomah Falls on the south bank of the Columbia River, and in Chilliwacke Valley just north of the forty-ninth parallel.

54. Carex magnifica Dewey, ined.

Carex sitchensis Hook. Fl. Bor. Am. **2**: 220. *t. 221.* 1839, not Prescott.

Range: British Columbia to California west of the Cascade Mountains.

Specimens examined: Montesano, *Heller* 3860; Ashford, *Allen*, August 15, 1898; Seattle, *Piper* 1107, 990; Cascades of Columbia, *Suksdorf* 20; Mouth of Columbia, *Scouler;* Lake Wenache, *Sandberg & Leiberg* 636; Clallam County, *Elmer* 2716; Vancouver, *Piper* 6443; Ilwaco, *Piper* 6447.

Zonal distribution: Humid Transition.

55. Carex marcida Boott in Hook. Fl. Bor. Am. **2**: 212. 1839.

Type locality: "Columbia River." Collected by Scouler.

Range: British Columbia to California and Colorado.

Specimens examined: North Yakima, *Steinweg; Henderson* 2065; Toppenish, *Henderson* 2059; Morgans Ferry, *Suksdorf* 62; Snipes Mountain, *Cotton* 316; Silver Lake, *Hen-*

derson 2029; Coulee City, *Henderson* 2062; Lake Chelan, *Lake & Hull* 363; Crab Creek, *Suksdorf* 58; Junction Crab and Wilson Creek, *Sandberg* 321; Wenas, *Griffiths & Cotton* 81; Grand Coulee, *Griffiths & Cotton* 447; Loomis, *Griffiths & Cotton* 347; Lake Omack, *Griffiths & Cotton* 408; Cow Creek, *Griffiths & Cotton* 537; Conconully, *Griffiths & Cotton* 278; Condons Ferry, *Griffiths & Cotton* 419; Toppenish, *Cotton* 1163, 1164, 1169; St. Johns, *Piper* 2744; Ellensburg, *Whited* 310.

ZONAL DISTRIBUTION: Upper Sonoran and Arid Transition.

56. Carex mertensii Prescott in Bong. Mem. Acad. St. Petersb. VI. **2**: 168. 1832.

TYPE LOCALITY: Sitka.

RANGE: Alaska to Oregon.

SPECIMENS EXAMINED: Clallam County, *Elmer* 2711; Olympic Mountains, *Piper* 2246; Mason County, *Henderson*, June, 1892; upper Nisqually Valley, *Allen* 166; Snoqualmie, *Smith* 988; Cascade Mountains, 49°, *Lyall* in 1859; Skagit Pass, *Lake & Hull* 401; Stevens Pass, *Sandberg & Leiberg*, August, 1893; *Whited*, August 27, 1901; Mount Adams, *Suksdorf* 33; Mount Stuart, *Elmer* 1174; Peshastin, *Sandberg & Leiberg* 513; Stehekin, *Griffiths & Cotton* 200; Nason Creek, *Sandberg & Leiberg* 674; without locality, *Vasey* in 1899; Horseshoe Basin, *Elmer* 739.

ZONAL DISTRIBUTION: Hudsonian.

57. Carex mirata Dew. Wood's Botany 428. 1865.

Carex exsiccata Bailey, Mem. Torr. Club **1**: 6. 1889.

Carex exsiccata globosa Bailey, l. c.

Carex vesicaria major Boott in Hook. Fl. Bor. Am. **2**: 221. 1839, not *C. teretiuscula major* Koch, Syn. 751. 1837.;

TYPE LOCALITY: "In Greece, eleven miles west of Rochester and six south of Lake Ontario," New York.

RANGE: Washington to California; Ontario; New York.

SPECIMENS EXAMINED: Seattle, *Piper* 993; upper Nisqually Valley, *Allen* 161; Clallam County, *Elmer* 2720.

ZONAL DISTRIBUTION: Humid Transition.

58. Carex monile pacifica Bailey, Proc. Cal. Acad. II. **3**: 105. 1890.

Carex vesicaria L. err. det. W. Boott in Wats. Bot. Cal. **2**: 252. 1876.

TYPE LOCALITY: Donner Lake, California.

RANGE: Washington and Idaho to California.

SPECIMENS EXAMINED: Klickitat River, *Flett* 1413; Union Flat, *Piper* 3044; *Henderson* 2095; Pullman, *Piper* 2659, 3509; *Hull* 382; Blue Mountains, *Lake & Hull*, July 1, 1892; Toppenish, *Henderson*, May 28, 1892.

ZONAL DISTRIBUTION: Transition, mainly.

59. Carex multimoda Bailey, Bot. Gaz. **21**: 5. 1896.

Carex festiva gracilis Olney, Proc. Am. Acad. **8**: 407. 1873, nom. nud.

TYPE LOCALITY: Oregon. Collected by Hall.

RANGE: Washington to California

SPECIMENS EXAMINED: Olympic Mountains, *Piper* 2249; Seattle, *Piper* 1110, 1111; Mount Rainier, *Allen* 193a; *Piper* 2536, 2544. East Sound, *Henderson*, July 3, 1892; Ellensburg, *Elmer* 403; Horseshoe Basin, *Elmer* 742, 741, 738; *Lake & Hull* 414; Lake Chelan, *Lake & Hull* 403, 371, 404. Clallam County, *Elmer* 2700, 2701; Vancouver, *Piper* 6476; Blue Mountains, *Piper* 2273; *Horner* 481; Hell Roaring River, *Cotton* 1513.

ZONAL DISTRIBUTION: Transition to Arctic.

60. Carex nardina Fries, Nov. Mant. **2**: 55. 1842.

TYPE LOCALITY: "In Junkersdalen Lapponiae Lilensis."

RANGE: Alaska to Greenland south to Washington and Montana. Europe. Asia.

SPECIMENS EXAMINED: Mount Rainier, *Allen* 173; *Piper* 2542; Mount Stuart, *Elmer*

1128; Mount Adams, *Flett* 1403; *Henderson*, August 10, 1892; Wenacho Mountains, *Whited* 844.

ZONAL DISTRIBUTION: Arctic.

61. Carex nebrascensis Dew. Am. Journ. Sci. II. **18**: 102. 1854.

Carex nebrascensis praevia Bailey, Mem. Torr. Club 1: 49. 1889.

Carex jamesii Torr. Ann. Lyc. N. Y. 398. 1836, not Schwein. 1824.

TYPE LOCALITY: None given, but presumably collected in Nebraska by Hayden.

RANGE: Washington to Nebraska and New Mexico.

SPECIMENS EXAMINED: Falcon Valley, *Suksdorf* 21; Wilbur, *Henderson*, July 12, 1892; Union Flat, *Piper* 3040; *Henderson* 2101; Pullman, *Lake & Hull* 397; Cow Creek, *Griffiths & Cotton*, 521.

ZONAL DISTRIBUTION: Arid Transition.

61a. Carex nebrascensis ultriformis Bailey, Bot. Gaz. **21**: 8. 1896.

TYPE LOCALITY: Ritzville, Washington. Collected by Sandberg & Leiberg.

RANGE: Washington.

SPECIMENS EXAMINED: Falcon Valley, *Howell* 104; Ritzville *Sandberg & Leiberg* 194; Union Flat, *Piper* 3041.

ZONAL DISTRIBUTION: Arid Transition.

62. Carex nervina Bailey, Bot. Gaz. **10**: 203. *pl. 3.* 1885.

TYPE LOCALITY: Summit Camp, California.

RANGE: Washington to California.

SPECIMENS EXAMINED: Little Klickitat River, *Henderson*, August 4, 1892.

63. Carex nigricans C. A. Meyer, Mem. Sav. Etr. Petersb. **1**: 211. 1831.

TYPE LOCALITY: "Habitat in Unalaschka."

RANGE: Alaska to California and Utah. Kamtschatca.

SPECIMENS EXAMINED: Mount Rainier, *Piper* 2539, 2551; *Smith*; *Allen* 268; Mount Stuart, *Elmer* 1130; Mount Adams, *Henderson*, August, 1892; *Howell* 101, 102; *Suksdorf*, August 8, 1882; Cascade Mountains, *Tweedy* 6; Skagit Pass, *Lake & Hull* 411; Horseshoe Basin, *Elmer* 737; Stevens Pass, *Sandberg & Leiberg* 767.

ZONAL DISTRIBUTION: Arctic.

64. Carex nudata W. Boott in Wats. Bot. Cal. **2**: 241. 1876.

TYPE LOCALITY: "In the Coast Ranges, from San Francisco Bay to Ukiah."

RANGE: California to Washington.

SPECIMENS EXAMINED: Without locality, August, 1882, probably collected by *Brandegee*.

64a. Carex nudata versuta nom. nov.

Carex aperta angustifolia Boott in Hook. Fl. Bor. Am. **2**: 218. 1839, nom. nud.

Carex nudata angustifolia Bailey, Mem. Torr. Club **1**: 16. 1889.

TYPE LOCALITY: "Fort Good Hope, Mackenzies River." Collected by Richardson.

RANGE: Oregon, Washington, and northward.

SPECIMENS EXAMINED: Cascade Mountains, latitude 49°, *Lyall*.

65. Carex occidentalis Bailey, Mem. Torr. Club **1**: 14. 1889.

Carex muricata americana Bailey, Proc. Am. Acad. **22**: 140. 1886.

TYPE LOCALITY: "Santa Rita Mountains, Arizona." Collected by Pringle.

RANGE: Washington and Montana to Arizona.

SPECIMENS EXAMINED: Klickitat County, *Suksdorf* 1297.

66. Carex oregonensis Olney; Bailey, Proc. Am. Acad. **22**: 73. 1886.

Carex halliana Bailey, Bot. Gaz. **9**: 117. 1884, not *C. hallii* Olney. 1871.

Carex oregonensis Olney, Proc. Am. Acad. **8**: 407. 1872, nom. nud.

TYPE LOCALITY: Oregon. Collected by Hall.

RANGE: Oregon and Washington.

Specimens examined: Mount Adams, *Suksdorf* 68, 52; Howell 97; Skamania County, *Flett* 1380; Yakima County, *Henderson*, August 12, 1882.

67. Carex pachystoma Holm, Am. Journ. Sci. IV. **20**: 302. 1905.

Type locality: Crater Lake National Park and Klamath County, Oregon; Mount Adams and west Klickitat County, Washington.

Range: Washington and Oregon.

Specimens examined: Mount Adams, *Suksdorf* 4248, 2959.

68. Carex paddoensis Suksdorf, Allg. Bot. Zeitschrift **12**: 43. 1906.

Type locality: Mount Paddo (Adams).

Specimens examined: Mount Rainier, *Allen* 172; *Piper* 2541; Mount Adams, *Howell* 92.

Zonal distribution: Arctic.

This species is related to *C. breweri* and *C. engelmanni*, to both of which species it has erroneously been referred.

69. Carex pansa Bailey, Bot. Gaz. **13**: 82. 1888.

Type locality: "Very abundant in drifting sand as well as borders of sea estuaries, Clatsop, Oregon, and Ilwaco, Washington Territory." Collected by Henderson.

Range: Sea coast of Washington and Oregon.

Specimens examined: Westport, *Henderson* in 1892; Ilwaco, *Piper* 6437.

Zonal distribution: Humid Transition.

70. Carex pauciflora Lightf. Fl. Scot. **2**: 543. *t. 6.* 1777.

Type locality: "In the isle of Arran," Scotland.

Range: Alaska to Labrador, south to Washington and Pennsylvania.

Specimens examined: Mount Constitution, *Henderson* 2056; Weiser Lake, *Suksdorf* 1015.

Zonal distribution: Canadian.

71. Carex phaeocephala nom. nov.

Carex leporina americana Olney, Proc. Am. Acad. **8**: 407. 1872, nom. nud.; **22**: 152. 1886. not *C. muricata americana* Bailey, Proc. Am. Acad. **22**: 140. 1886.

Type locality: Oregon. Collected by Hall.

Range: British Columbia to Oregon and Colorado.

Specimens examined: Olympic Mountains, *Piper* 2553; Mount Rainier, *Piper* 2535; *Allen*, August 14, 1895; Mount Adams, *Suksdorf* 8, 9, 10, 592; Mount Stuart, *Elmer* 1133; Cascade Mountains, *Tweedy* 10.

Zonal distribution: Arctic.

This species has been considered to be the same as *C. preslii* Steud., based on the *C. leporina* L. of Presl in Reliquiae Haenkeanae. The type of *C. preslii* came from the shores of Nootka Sound, and there is scarcely a possibility that the high alpine *C. leporina americana* can be the same. It is much more likely that *C. preslii* is a form of *C. festiva*. *C. petasata* Dewey, the type of which is in the Gray Herbarium, is a very different species from *C. phaeocephala*.

72. Carex polymorpha Muhl. Gram. Descr. 239. 1817.

Type locality: "Habitat in Pennsylvania."

Range: Washington; Massachusetts to North Carolina.

Specimens examined: Skamania County, *Suksdorf* 2895.

73. Carex prionophylla Holm, Am. Journ. Sci. IV. **15**: 423. 1902.

Type locality: "Divide between St. Joe and Clearwater rivers," Idaho.

Range: Washington and Idaho.

Specimens examined: Mount Carlton, *Kreager* 264.

74. Carex pulchella Holm, Am. Journ. Sci. IV. **16**: 457. 1903.

Carex hallii Bailey, Proc. Am. Acad. **22**: 82. 1886, not *C. hallii* Olney. 1871.

Type locality: Oregon. Collected by Hall.

Range: Washington to California.

Specimens examined: Klickitat Meadows, *Flett* 1357, 1365; without locality, *Vasey* in 1889; Falcon Valley, *Suksdorf* 816, 1284.

75. **Carex pyrenaica** Wahl. Kongl. Vet. Akad. Handl. **24**: 139. 1803.

Type locality: "Hab. in Pyrenaeis."

Range: Alaska to Colorado and California. Asia. Europe.

Specimens examined: Olympic Mountains, *Flett* 825; *Elmer* 2722; Mount Rainier, *Piper* 2540; *Allen* 171; Mount Adams, *Suksdorf* 28.

Zonal distribution: Arctic.

76. **Carex raynoldsii** Dew. Am. Journ. Sci. II. **32**: 39. 1861.

Carex lyallii Boott, Ill. 150. *pl. 483*. 1858.

Type locality: "Pierre's Hole, Snake River Valley, alt. 6,000 ft." Collected by Hayden.

Range: Wyoming to Montana, westward to California and British Columbia.

Specimens examined: Mount Chapaca, *Elmer* 580; Mount Adams, *Henderson*, August, 1892; Wenache Region, *Brandegee* 1143; Cascade Mountains, latitude 49°, *Lyall* (type of *C. lyallii*); Wenache Mountains, *Cotton* 1240.

Zonal distribution: Canadian and Hudsonian.

77. **Carex retrorsa** Schwein. Ann. Lyc. N. Y. **1**: 71. 1824.

Type locality: Massachusetts.

Range: British Columbia to Saskatchewan, southward to Washington and Pennsylvania.

Specimens examined: Peshastin, *Sandberg & Leiberg* 592; Loomis, *Elmer* 616; Waitsburg, *Horner* 29; Clarks Springs, *Kreager* 566; Priest Rapids, *Cotton* 1379.

Zonal distribution: Arid Transition and Upper Sonoran.

78. **Carex richardsoni** R. Br. in Richards. Bot. App. Frankl. Journ. 751. 1823.

Type locality: British America "In the wooded country from latitude 54° to 64° north."

Range: Saskatchewan to New York, South Dakota, and Washington.

Specimens examined: Near Waitsburg, *Horner* 208.

79. **Carex rigida hesperia** nom. nov.

Carex vulgaris bracteosa Bailey, Proc. Am. Acad. **22**: 81. 1886, not *C. bracteosa* Schwein. 1824.

Type locality: "Ebbett's Pass, California, alt. 8,000 feet." Collected by Brewer.

Range: Washington to California.

Specimens examined: Cascade Mountains, *Tweedy* 19, 24; mountains north of Ellensburg, *Brandegee* 1142; Mount Rainier, *Allen* 269; *Piper* 2533 in part; Mount Adams, *Suksdorf* 16, 17, 36.

Zonal distribution: Arctic.

80. **Carex rossii** Boott in Hook. Fl. Bor. Am. **2**: 222. 1839.

Carex deflexa rossii Bailey, Bot. Gaz. **10**: 207. 1885.

Carex deflexa media Bailey, Mem. Torr. Club **1**: 43. 1889.

Type locality: "N. W. Coast, *Douglas*; Rocky Mountains, *Drummond*."

Range: British Columbia to Colorado and Oregon.

Specimens examined: Clallam County, *Elmer* 2718; Coupeville, *Gardner* 343; Mount Rainier, *Allen* 168; Mount Adams, *Henderson* 2094; *Suksdorf* 24; Klickitat River, *Suksdorf* 48; Hangman Creek, *Sandberg & Leiberg* 30; Kamiak Butte, *Piper* 3094; Blue Mountains, *Horner* 480; Mount Rainier, *Piper* 2543, 2552, 2537; west Klickitat County, *Suksdorf* 77; Olympia, *Henderson* 2093; Wenache Region, *Brandegee* 1145.

Zonal distribution: Arctic to Transition.

It is exceedingly probable that all the Oregon and Washington specimens that have been referred to *C. varia* Muhl. and *C. novae-angliae* Schwein. are in reality forms of *C. rossii*,

80. Carex rostrata Stokes; With. Bot. Arr. Brit. Veg. ed. 2. 1059. 1787.

Carex ampullacea Goodenough, Trans. Linn. Soc. **2**: 207. 1794.

TYPE LOCALITY: "Bogs of Isla, and on Bentelkerny in Breadalbane," Great Britain.

RANGE: British Columbia to Newfoundland south to New York, Utah, and California.

SPECIMENS EXAMINED: Mount Adams, *Suksdorf* 1278.

81. Carex scirpoidea Michx. Fl. **2**: 171. 1803.

Carex pseudoscirpoidea Rydberg, Mem. N. Y. Bot. Gard. **1**: 78. 1900.

TYPE LOCALITY: "Ad sinum Hudsonis."

RANGE: Alaska to Greenland, south to New England and Washington.

SPECIMENS EXAMINED: Olympic Mountains, *Piper* 2243; Mount Stuart, *Elmer* 1126; Skagit Pass, *Lake & Hull* 408; Horseshoe Basin, *Elmer* 684.

ZONAL DISTRIBUTION: Arctic.

The western form is somewhat larger and broader-leaved as a rule, a difference we consider too slight to warrant separating it as a distinct species as has been done by Rydberg.

82. Carex scoparia Schkuhr; Willd. Sp. Pl. **4**: 230. 1805.

TYPE LOCALITY: "Habitat in America boreali."

RANGE: British Columbia to Nova Scotia south to Colorado and Florida.

SPECIMENS EXAMINED: Vancouver, *Henderson*, June 12, 1892.

ZONAL DISTRIBUTION: Arid Transition.

83. Carex scopulorum Holm, Am. Journ. Sci. IV. **14**: 422. 1902.

TYPE LOCALITY: "In the region of Clear Creek Cañon" Colorado.

RANGE: Washington to Montana and Colorado.

SPECIMENS EXAMINED: Olympic Mountains, *Piper* 2247; *Flett* 826; Mount Rainier, *Allen* 170; *Piper* 2533 in part; Little Klickitat River, *Henderson*, August 4, 1892; Horseshoe Basin, *Elmer* 729; *Lake & Hull* 407; Mount Adams, *Suksdorf* 4246, 4247.

ZONAL DISTRIBUTION: Arctic and Hudsonian.

84. Carex siccata Dewey, Am. Journ. Sci. **10**: 278. 1826.

TYPE LOCALITY: Westfield, Massachusetts.

RANGE: Alaska to Ontario, south to Oregon and New York.

SPECIMENS EXAMINED: Mount Baldy, Wenache Mountains, *Cotton* 1757.

85. Carex sitchensis Prescott in Bong. Mem. Acad. St. Petersb. VI. **2**: 169. 1832.

Carex howellii Bailey, Mem. Torr. Club, **1**: 45. 1889.

TYPE LOCALITY: Sitka.

RANGE: Alaska to Oregon along the coast.

SPECIMENS EXAMINED: Shoalwater Bay, *Henderson* 1783; Mount Constitution, *Henderson* 2086.

ZONAL DISTRIBUTION: Humid Transition and Canadian.

86. Carex specifica Bailey, Mem. Torr. Club **1**: 21. 1889.

TYPE LOCALITY: "California, Silver Valley, head of Toulumne River, and Ebbett's Pass."

RANGE: Washington to California.

SPECIMENS EXAMINED: Mount Adams, *Suksdorf* 3099.

87. Carex spectabilis Dew. Am. Journ. Sci. **29**: 248. *pl. 10. f. 76.* 1836.

Carex invisa Bailey, Proc. Am. Acad. **22**: 82. 1887.

TYPE LOCALITY: "Found in the Arctic Regions."

RANGE: British Columbia to California.

SPECIMENS EXAMINED: Mount Rainier, *Allen* 194a, 195a; *Piper* 2545, 2538; *Smith*, August, 1890; Mount Adams, *Suksdorf* 39, 76; Skagit Pass, *Lake & Hull* 402, 407; Fort Vancouver; Olympic Mountains, *Flett* 826.

ZONAL DISTRIBUTION: Arctic.

Our species has erroneously been referred to *C. podocarpa* R. Br., a quite different plant.

88. Carex stellulata Good. Trans. Linn. Soc. **2**: 144. 1794.

TYPE LOCALITY: England.

Range: Alaska to Labrador south to California and Maryland. Europe. Asia.

SPECIMENS EXAMINED: Stevens Pass, *Sandberg & Leiberg* 761; Lake Keechelus, *Henderson* in 1892; Mount Constitution, *Henderson*, July, 1892.

ZONAL DISTRIBUTION: Canadian.

88a. Carex stellulata excelsior (Bailey).

Carex sterilis excelsior Bailey, Bull. Torr. Club **20**: 424. 1893.

Carex echinata excelsior Fernald, Proc. Am. Acad. **37**: 484. 1902.

TYPE LOCALITY: None given.

RANGE: British Columbia and Oregon to Newfoundland and North Carolina.

SPECIMENS EXAMINED: Seattle, *Piper* 1111; Vancouver, *Piper* 6444.

ZONAL DISTRIBUTION: Humid Transition.

88b. Carex stellulata ormantha (Fernald).

Carex echinata ormantha Fernald, Proc. Am. Acad. **37**: 483. 1902.

TYPE LOCALITY: Strawberry Creek, Eldorado County, California.

RANGE: Washington to California. Connecticut.

SPECIMENS EXAMINED: Mount Adams, *Henderson*, August, 1892.

89. Carex stipata Muhl.; Willd. Sp. Pl. **4**: 233. 1805.

TYPE LOCALITY: Pennsylvania.

RANGE: British Columbia to Newfoundland, south to California and Florida.

SPECIMENS EXAMINED: Olympic Mountains, *Grant* in 1889; Clallam County, *Elmer* 2705; Seattle, *Piper* 998; North Yakima, *Griffiths & Cotton* 62; Ellensburg, *Whited* 511; Peshastin, *Sandberg & Leiberg* 589; west Klickitat County, *Suksdorf* 29; Cascade Mountains, *Tweedy* 17; Blue Mountains, *Lake & Hull* 377; Pullman, *Piper*, July, 1893; Vancouver, *Piper* 6438.

ZONAL DISTRIBUTION: Transition.

90. Carex straminiformis Bailey, Mem. Torr. Club **1**: 24. 1889.

Carex straminea congesta Boott; Olney, Proc. Am. Acad. **7**: 393. 1868, not *Carex congesta* Meyer. 1858.

TYPE LOCALITY: Mount Shasta, California. Collected by Brewer.

RANGE: California, Oregon, and Washington.

SPECIMENS EXAMINED: Mount Adams, *Howell*, August, 1882; *Henderson*, August 7, 1882; *Suksdorf*.

ZONAL DISTRIBUTION: Arctic?

91. Carex tenella Schkuhr, Riedgr. 23. *f. 104*. 1801.

TYPE LOCALITY: Unknown.

RANGE: New Jersey to California and northward.

SPECIMENS EXAMINED: Klickitat River, *Suksdorf* 73.

92. Carex teretiuscula ampla Bailey, Mem. Torr. Club **1**: 53. 1889.

TYPE LOCALITY: "Quaking bogs, head of Burnt River, E. Oregon." Collected by Cusick.

RANGE: Washington, Oregon, Idaho, and British Columbia.

SPECIMENS EXAMINED: Seattle, *Piper* 1002; Tacoma, *Flett* 210; Nisqually Valley, *Allen* 165; Coupeville, *Gardner* 308; McAllisters Lake, *Henderson*, June 22, 1892; Marshall Junction, *Piper* 2282; Pend Oreille River, *Lyall* in 1861; Vancouver, *Piper* 6445.

ZONAL DISTRIBUTION: Humid Transition.

93. Carex umbellata brachyrhina nom. nov.

Carex umbellata brevirostris Boott, Ill. **2**: 99. *t. 294*. 1860, not *C. brevirostris* Cederstr. 1857.

TYPE LOCALITY: "Carlton House." Collected by Richardson.

RANGE: British Columbia to Saskatchewan and Maine south to California and New Mexico.

SPECIMENS EXAMINED: Mount Rainier, *Allen* 168; Coupeville, *Gardner* 343; Hangman Creek, *Sandberg & Leiberg* 30; Olympia, *Henderson* 2093.

94. **Carex usta** Bailey, Mem. Torr. Club, 1: 20. 1889.

Carex douglasii brunnea Olney, Bot. King Explor. 363. 1871, not *C. brunnea* Thunberg.

TYPE LOCALITY: California.

RANGE: Washington to Nevada and California.

SPECIMENS EXAMINED: Colville Reservation, *Griffiths & Cotton* 408; Kittitas Valley, *Cotton* 1216.

ZONAL DISTRIBUTION: Arid Transition.

95. **Carex utriculata** Boott in Hook. Fl. Bor. Am. 2: 221. 1839.

TYPE LOCALITY: British America. Collected by Richardson.

RANGE: Alaska to Labrador south to California and Delaware.

SPECIMENS EXAMINED: Lake Wenache, *Sandberg & Leiberg* 640; Seattle, *Piper* 994; Tacoma, *Flett* 208; Clealum Lake, *Cotton* 846; Stehekin, *Griffiths & Cotton* 210; Mission, *Griffiths & Cotton* 490; Loomis, *Griffiths & Cotton* 332; Cow Creek, *Griffiths & Cotton* 497; Railroad Creek, *Elmer* 758; Marshall Junction, *Piper* 2277; Waitsburg, *Horner* 202; Mount Adams, *Henderson* 2095; Mount Adams, *Suksdorf* 1278.

ZONAL DISTRIBUTION: Transition, mainly.

96. **Carex vernacula** Bailey, Bull. Torr. Club 20: 417. 1893.

Carex foetida "All." of American authors.

TYPE LOCALITY: "Colorado and Wyoming."

RANGE: Washington to California and Colorado.

SPECIMENS EXAMINED: Mount Adams, *Suksdorf* 812; *Henderson*.

ZONAL DISTRIBUTION: Arctic.

97. **Carex vespertina** (Bailey) Howell, Fl. N. W. Am. 1: 705. 1903.

Carex pennsylvanica vespertina Bailey, Mem. Torr. Club 1: 74. 1889.

TYPE LOCALITY: "Dry hills near the Cascades of the Columbia," Oregon. Collected by Howell and by Henderson.

RANGE: Oregon to British Columbia.

SPECIMENS EXAMINED: Waitsburg, *Horner* 208; Olympia, *Henderson* 2077; Chiquash Mountains, *Suksdorf* 2990; Mount Adams, *Suksdorf* 292, 437, 23, 67; *Henderson* 2078; Klickitat River, *Flett* 1406.

ZONAL DISTRIBUTION: Arid Transition.

Specimens of this have been referred to *C. globosa* Boott, a species which seems not to occur in Washington.

98. **Carex vicaria** Bailey, Mem. Torr. Club 1: 49. 1889.

TYPE LOCALITY: "Oregon and California."

RANGE: Washington to California.

SPECIMENS EXAMINED: Vancouver, *Piper* 6439.

ZONAL DISTRIBUTION: Humid Transition.

99. **Carex vulpinoidea** Michx. Fl. 2: 169. 1803.

TYPE LOCALITY: "In Canada et Nova Anglia."

RANGE: Washington to New Brunswick, south to Florida and Texas.

SPECIMENS EXAMINED: West Klickitat County, *Suksdorf* 1298; Ophir, *Elmer* 516; Cusick, *Piper*, September, 1903; Usk, *Kreager*, August 16, 1902.

ZONAL DISTRIBUTION: Arid Transition.

Besides the above listed species in this difficult genus a number of others have been reported from the region, but there is too much uncertainty regarding them to warrant their inclusion. *Carex incisa* Boott[a] is based on Geyer's specimen collected in "rich mould; thickets of the fertile plains above Colville." The brief description is as follows: "Differt a *C. scabrata* Schkuhr perigyniis laevibus, etc., squamis foemineis viscidis, etc., F. B." It has not been identified. *Carex rosea* Schk., reported in Hooker's Flora[b] as collected by Scouler on the Columbia River, has not since been found in this region. Other species reported from the Columbia River in Hooker's Flora are *C. stricta* Lam., *C. angustata* Boott, *C. lagopodioides* Schk. (*C. tribuloides* Wahl.) and *C. straminea* Schk. As none of these have recently been collected, it is quite certain that the specimens will be found to represent other species.

ARACEAE. Arum Family.

LYSICHITON.

1. **Lysichiton camtschatcense** (L.) Schott, Prodr. Aroid. 421. 1860. Skunk cabbage.
Symplocarpus kamtschaticus Bong. Mem. Acad. St. Petersb. VI. 2: 168. 1832.
Dracontium camtschatcense L. Sp. Pl. 2: 968. 1753.
Type locality: "Habitat in Sibiria."
Range: Alaska to California and Idaho. Siberia.

Specimens examined: Clallam County, *Elmer* 2786; Seattle, *Piper*, July, 1895; Silverton, *Bouck* 174; upper Nisqually Valley, *Allen* 210; Wenache Lake, *Sandberg & Leiberg* 642; Yakima Pass, *Watson* 400; Nason City, *Sandberg & Leiberg*, July, 1893; Marshall Junction, *Piper*, July, 1896; Davis Ranch, *Kreager* 295.

Zonal distribution: Transition.

LEMNACEAE. Duckweed Family.

Thalloid shoot with 1 root .... Lemna.
Thalloid shoot with several roots .... Spirodela.

LEMNA.

Thalloid shoot nearly circular, 1.5 to 5 mm. long .... 1. *L. minor.*
Thalloid shoot oblong, stalk-like at base .... 2. *L. trisulca.*

1. **Lemna minor** L. Sp. Pl. 2: 970. 1753.
Type locality: Europe.
Range: Nearly cosmopolitan.

Specimens examined: Whidby Island, *Gardner* 429; Ellensburg, *Piper*, May, 1897; North Yakima, *Henderson* 2534; Waitsburg, *Horner*, July, 1896; Meyers Falls, *Kreager* 515.

2. **Lemna trisulca** L. Sp. Pl. 2: 970. 1753.
Type locality: Europe.
Range: Throughout North America. Asia. Europe.
Specimens examined: Coupeville, *Gardner* 430; near Seattle, *Tarleton*.

SPIRODELA.

1. **Spirodela polyrhiza** (L.) Schleid. Linnaea 13: 392. 1839.
Lemna polyrhiza (L.) Sp. Pl. 2: 970. 1753.
Type locality: Europe.
Range: Nearly cosmopolitan.
Specimens examined: Whidby Island, *Gardner* 428; Seattle, *Piper*, August, 1897.

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[a] Boott; Hook. Journ. Bot. 7: 377. 1869.
[b] Hook. Fl. Bor. Am. 2: 212. 1839.

PONTEDERIACEAE. Pondweed Family.

HETERANTHERA.

1. **Heteranthera dubia** (Jacq.) MacM. Met. Minn. 138. 1892.
Commelina dubia Jacq. Obs. Bot. **3**: 9. *pl. 59.* 1768.
Schollera graminifolia Willd. Neue. Schr. Ges. Naturf. Fr. **3**: 438. 1801, nom. nud.
Heteranthera graminea Vahl, Enum. **2**: 45. 1806.
Leptanthus gramineus Michx. Fl. **1**: 25. 1803.
Type locality: The type specimen is Clayton's number 814, probably from Virginia.
Range: Washington to Ontario, south to Mexico and Florida.
Specimens examined: Hangman or Latah Creek near Marshall Junction, *Suksdorf.*

JUNCACEAE. Rush Family.

Leaf sheaths open; capsule 1 or 3-celled, many-seeded; placentae parietal or axial .... Juncus (p. 178).
Leaf sheaths closed; capsule 1-celled, 3-seeded; placenta basal....... Juncoides (p. 184).

JUNCUS. Rush.

Lowest leaf of the inflorescence appearing like a continuation of the stem, the inflorescence therefore seemingly lateral.
Flowers in compound panicles, usually numerous.
Stamens 3; leaf of the inflorescence much shorter than the stem.
Perianth green; panicle loose...................... 1. *J. effusus.*
Perianth brown; panicle close...................... 1a. *J. effusus hesperius.*
Stamens 6.
Perianth green; leaf of the inflorescence as long as the stem.................................... 2. *J. filiformis.*
Perianth parts brown, a green stripe each side of the midrib.
Flowers 3 to 4.5 mm. long.................... 3. *J. balticus.*
Flowers 5 to 6 mm. long..................... 4. *J. lescurii.*
Flowers few, 1 to 3 in each cluster.
Inner sheaths bristle-tipped; capsule retuse............ 5. *J. subtriflorus.*
Inner sheaths leaf-bearing; capsule acute.............. 6. *J. parryi.*
Lowest leaf of the inflorescence not appearing like a continuation of the stem.
Leaves not provided with cross-partitions, either flat and grass-like or terete and channeled.
Flowers bracteolate, loosely scattered or somewhat congested but not in heads.
Annuals; stems branched, leafy.
Stamens 6; flowers loosely scattered.
Capsule oblong.......................... 7. *J. bufonius.*
Capsule globose......................... 8. *J. sphaerocarpus.*
Stamens 3.
Inflorescence 1-flowered; bract 1......... 9. *J. uncialis.*
Inflorescence few-flowered; bracts 2 or more, style short..................... 10. *J. brachystylus.*
Perennials, stems simple.
Perianth segments 2.5 to 4 mm. long; capsule 3-celled, panicle close...................... 11. *J. confusus.*

      - Perianth segments 3.5 to 5.5 mm. long; capsule 1-celled.
        - Panicle loose; flowers pale green.......... 12. *J. tenuis.*
        - Panicle close; flowers fuscous............ 13. *J. occidentalis.*
  - Flowers not bracteolate, in true heads.
    - Auricles of the leaf-sheaths wanting; perianth parts minutely roughened.
      - Perianth shorter than the capsule; heads several to many, 3 to 5-flowered.............. 14. *J. covillei.*
      - Perianth longer than the capsule.
        - Seeds not tailed.
          - Flowers in 1, rarely 2 or 3, large heads. 15. *J. falcatus.*
          - Flowers in 3 to 20 small heads....... 16. *J. orthophyllus.*
        - Seeds tailed.............................. 17. *J. regelii.*
    - Auricles of the leaf-sheaths present; perianth parts smooth.................................. 18. *J. longistylis.*
- Leaves provided with distinct cross-partitions.
  - Blades of the leaves equitant.
    - Heads pale, numerous; stamens 6; plant tall....... 28. *J. oxymeris.*
    - Heads brown or black.
      - Stamens 6; heads solitary; stems not 2-edged.. 29. *J. mertensianus.*
      - Stamens 3 (rarely 6); stems 2-edged.
        - Flowers in 2 to several dense nearly black heads................................ 27. *J. ensifolius.*
        - Flowers in many brown heads........... 27a. *J. ensifolius major.*
  - Blades of the leaves cylindric or only slightly compressed.
    - Stamens 3.................................. 19. *J. acuminatus.*
    - Stamens 6.
      - Capsules subulate; heads many-flowered.
        - Leaf blades erect; inner perianth parts longer than the outer.................. 22. *J. nodosus.*
        - Leaf blades spreading; outer perianth parts longer than the inner................. 23. *J. torreyi.*
      - Capsules not subulate.
        - Heads pale, few-flowered; capsules oblong-lanceolate.
          - Perianth segments less than 5 mm. long.............................. 20. *J. richardsonianus.*
          - Perianth segments over 5 mm. long.. 21. *J. oreganus.*
        - Heads brown; capsules oblong, abruptly acute.
          - Perianth pale brown; seeds reticulated, the longitudinal striae 20 to 26................................ 24. *J. columbianus.*
          - Perianth dark brown; seeds about 15-striate.
            - Stout 60 to 100 cm. high; heads several or many; capsule shorter than the perianth..... 25. *J. suksdorfii.*
            - Slender 20 to 40 cm. high; heads few; capsule as long as the perianth..................... 26. *J. badius.*

1. **Juncus effusus** L. Sp. Pl. **1**: 326. 1753.

? *Juncus effusus gracilis* Hook. Fl. Bor. Am. **2**: 190. 1838.

TYPE LOCALITY: European.

RANGE: Subarctic and temperate North America. Europe. Asia.

SPECIMENS EXAMINED: Mason County, *Kincaid*, June, 1892; King County, *Suksdorf* 1010; Seattle, *Piper* 1029; Everett, *Piper*.

ZONAL DISTRIBUTION. Humid Transition.

1a. **Juncus effusus hesperius** nom nov.

Juncus effusus brunneus Engelm. Trans. St. Louis Acad. **2**: 491. 1868, not *J. tenageia brunneus* Neilreich 1859.

TYPE LOCALITY: Cerro Leon, Mexico.

RANGE: Washington to California near the seacoast.

SPECIMENS EXAMINED: Clallam County, *Elmer* 2728; Montesano, *Heller* 3970; Olympic Mountains, *Grant;* Chambers Lake, *Henderson*, August 23, 1892; Lillewaup, *Henderson* 1860; without locality, *Cooper* in 1852; Klickitat County, *Suksdorf* 2157; Everett, *Piper*.

ZONAL DISTRIBUTION: Humid Transition.

2. **Juncus filiformis** L. Sp. Pl. **1**: 326. 1753.

TYPE LOCALITY: European.

RANGE: British Columbia to Labrador, south to Colorado and Pennsylvania. Europe. Asia.

SPECIMENS EXAMINED: Cascade Mountains, 49°, *Lyall;* Skamania County, *Suksdorf* 216; Nason City, *Sandberg & Leiberg* 602; Rogers Lake, *Elmer* 717.

This species has been mistaken for *J. patens* Meyer, and we believe that all Washington references to the latter really belong to *J. filiformis*.

3. **Juncus balticus** Willd. Ges. Naturf. Fr. Berlin. Mag. **3**: 298. 1809.

TYPE LOCALITY: "Bei Warnemünde," Germany.

RANGE: Alaska to Labrador, south to California, Nebraska, and New York. Europe. Asia.

SPECIMENS EXAMINED: Clallam County, *Elmer* 2730; Whidby Island, *Gardner* 299; Fidalgo Island, *Lyall* in 1858; Lake Osoyoos, *Lyall* in 1860; Falcon Valley, *Suksdorf* 2146, 214, 215; Egbert Springs, *Sandberg & Leiberg* 404; Seattle, *Smith* 1021; Longmire Springs, *Piper*, August, 1895; Wenache, *Whited* 1422; Ellensburg, *Whited* in 1897; North Yakima, *Henderson* 2554; Wilbur, *Henderson*, July, 1892; Rock Lake, *Lake & Hull* 385, 393; Pullman, *Henderson* 2553; *Piper*, August 2, 1899; without locality, *Vasey* in 1889; Clealum Lake, *Cotton* 850; Conconully, *Griffiths & Cotton* 320.

ZONAL DISTRIBUTION: Upper Sonoran and Transition.

4. **Juncus lescurii** Boland. Proc. Cal. Acad. **2**: 179. 1858–62.

TYPE LOCALITY: Salt marshes of San Francisco Bay, California.

RANGE: Vancouver Island to Chile, on the seashore.

SPECIMENS EXAMINED: Westport, *Henderson* 2552; *Heller* 3945; Thurston County, *Henderson* 2550; Cascade Mountains, *Tweedy* 34, 35; Oyhut, *Conard* 412.

ZONAL DISTRIBUTION: Humid Transition.

5. **Juncus subtriflorus** (Meyer) Coville, Contr. Nat. Herb. **4**: 208. 1893.

Juncus compressus subtriflorus Meyer, Linnaea **3**: 368. 1828.

Juncus drummondii Meyer; Ledeb. Fl. Ross. **4**: 235. 1853.

TYPE LOCALITY: "Hab. in insulis Koräginsk."

RANGE: Alaska to California and Colorado.

SPECIMENS EXAMINED: Olympic Mountains, *Flett* 828; Mount Rainier, *Allen* 68; Cascade Mountains, *Tweedy* 31; same, latitude 49°, *Lyall* in 1859; Mount Stuart, *Elmer* 1139; Mount Adams, *Henderson*, August, 1892; Skamania County, *Suksdorf* 1011; Nason Creek, *Sandberg & Leiberg* 675; Bridge Creek, *Elmer* 652; Blue Mountains, *Piper* 2274.

ZONAL DISTRIBUTION: Arctic.

6. **Juncus parryi** Engelm. Trans. St. Louis Acad. **2**: 446. 1866.

TYPE LOCALITY: Colorado. Collected by Parry.

RANGE: British Columbia to Colorado and California.

SPECIMENS EXAMINED: Clallam County, *Elmer* 2733; Olympic Mountains, *Flett* 111, *Henderson* 1025; Mount Rainier, *Piper* 2169; Mount Adams, *Henderson*, August, 1892; Cascade Mountains to Fort Colville, *Lyall* in 1860; Skamania County, *Suksdorf* 1041; Chiquash Mountains, *Suksdorf* 1041; Skagit Pass, *Lake & Hull* 410; Nason Creek, *Sandberg & Leiberg* 665; Horseshoe Basin, *Elmer* 736; Mount Carlton, *Kreager* 231.

ZONAL DISTRIBUTION: Arctic.

7. **Juncus bufonius** L. Sp. Pl. **1**: 328. 1753.

TYPE LOCALITY: European.

RANGE: Nearly cosmopolitan.

SPECIMENS EXAMINED: Clallam County, *Elmer* 2734; Southbend, *Spillman*, August 2, 1889; Silver Lake, *Henderson*, July, 1892; North Yakima, *Watt*, August, 1895; Harrington, *Sandberg & Leiberg* 218; Spokane, *Henderson*, July, 1892; Pullman, *Piper*.

ZONAL DISTRIBUTION: Upper Sonoran and Transition.

8. **Juncus sphaerocarpus** Nees, Flora **1**: 521. 1818.

TYPE LOCALITY: European.

RANGE: British Columbia to Colorado and California. Europe.

SPECIMENS EXAMINED: Cheney, *Mrs. Tucker* 137; Bingen, *Piper* 6446; Pullman, *Elmer* 1044.

9. **Juncus uncialis** Greene, Pittonia **2**: 105. 1890.

Juncus triformis uniflorus Engelm. Trans. St. Louis Acad. **2**: 493. 1868, not *J. trifidus uniflorus* Tausch. 1834.

TYPE LOCALITY: "Low moist places in fields near Suisun, California."

RANGE: Washington to California.

SPECIMENS EXAMINED: Falcon Valley, *Suksdorf*, June 25, 1881.

10. **Juncus brachystylus** (Engelm.).

Juncus triformis brachystylus Engelm. Trans. St. Louis Acad. **2**: 492. 1868.

TYPE LOCALITY: "Ukiah, Mendocino county," California.

RANGE: Washington to California.

SPECIMENS EXAMINED: West Klickitat County, *Suksdorf*, June 19, 1882.

11. **Juncus confusus** Coville, Proc. Biol. Soc. Wash. **10**: 127. 1896.

TYPE LOCALITY: "In an irrigated meadow, North Park, Colorado"

RANGE: Washington to Colorado and Montana.

SPECIMENS EXAMINED: Falcon Valley, *Suksdorf* 2191; Spangle, *Suksdorf* 1042.

12. **Juncus tenuis** Willd. Sp. Pl. **2^1**: 214. 1799.

TYPE LOCALITY: "Habitat in America boreali."

RANGE: Nearly throughout North America.

SPECIMENS EXAMINED: Montesano, *Heller* 4074; Seattle, *Piper* 1134; Egbert Springs, *Sandberg & Leiberg* 389, 388; Wenache, *Whited*: Fort Colville, *Lyall* in 1860; Rock Lake, *Lake & Hull* 387; Loomis, *Elmer* 576; Palouse City, *Henderson*, July, 1892; Blue Mountains, *Lake & Hull* 375; Pullman, *Piper* 1939; Stehekin, *Griffiths & Cotton* 187; Prosser, *Cotton* 647, 659.

ZONAL DISTRIBUTION: Transition.

13. **Juncus occidentalis** (Coville) Wiegand, Bull. Torr. Club **27**: 521. 1900.

Juncus tenuis occidentalis Coville, Proc. Biol. Soc. Wash. **10**: 129. 1896.

Juncus tenuis congestus Engelm. Trans. St. Louis Acad. **2**: 450. 1866, not *J. congestus* Thuill. 1799.

TYPE LOCALITY: "In California (San Francisco, *Bolander;* Monterey, *Brewer*) and in Colorado, *Hall*."

Range: British Columbia to California.

Specimens examined: Coupeville, *Gardner* 295, 300; Lake Chelan, *Lake & Hull* in 1892; *Elmer*, August, 1897; Pullman, *Piper* 3051; *Elmer*, July 20, 1896; Cow Creek, *Griffiths & Cotton* 504.

Zonal distribution: Transition.

14. Juncus covillei nom. nov.

Juncus falcatus paniculatus Engelm. Trans. St. Louis Acad. 495. 1868, not *J. paniculatus* Hoppe, 1823.

Juncus latifolius paniculatus Buch. Engl. Bot. Jahrb. **18**: 426. 1890.

Type locality: "Sphagnous swamp near Mendocino, California."

Range: British Columbia to California, in the coast region.

Specimens examined: Clallam County, *Elmer* 2732; Whatcom County, *Gardner* 410; Seattle, *Piper* 1033, 2762; Mount Adams, *Suksdorf* 219; Vancouver, *Piper* 4928; Lake Crescent, *Lawrence* 303.

Zonal distribution: Humid Transition.

15. Juncus falcatus E. Meyer, Syn. Luz. 34. 1823.

Juncus menziesii R. Br.; Hook. Fl. Bor. Am. **2**: 192. 1838.

Type locality: "Mont-Real," that is, Monterey, California. Collected by Haenke.

Range: Washington to California.

Specimens examined: Westport, *Henderson*, June 26, 1892.

Zonal distribution: Humid Transition.

16. Juncus orthophyllus Coville, Contr. Nat. Herb. **4**: 207. 1893.

Juncus latifolius Buch. Engl. Bot. Jahrb. **18**: 425. 1890.

Juncus longistylis latifolius Engelm. Trans. St. Louis Acad. **2**: 496. 1868, not *Juncus latifolius* Wulf. 1789.

Type locality: "Californian Sierras on alpine meadows or along rivulets in the Yosemite Valley, alt. 4000 feet."

Range: British Columbia to California.

Specimens examined: Cascade Mountains, 49°, *Lyall* in 1859; Clealum, *Henderson*, June, 1892; Rock Lake, *Lake & Hull* 386; Pullman, *Piper* 1765, 3024, 3052.

Zonal distribution: Arid Transition.

17. Juncus regelii Buch. Engler's Bot. Jahrb. **18**: 414. 1890.

Type locality: "Im westlichen Nordamerika von Washington anscheinend bis Utah." Collected by Suksdorf and by Jones.

Range: Washington and Idaho to Utah.

Specimens examined: Mount Adams, *Henderson* 1527; *Suksdorf*; *Flett* 1360; Mount Stuart, *Sandberg & Leiberg* 822, 579; Klickitat River, *Flett* 1367; Yakima County, *Watt*, August, 1895; Clealum, *Henderson*, June 11, 1892; Bridge Creek, *Elmer* 746; Loomis, *Elmer* 575; Blue Mountains, *Horner* 484; Whitman County, *Lake & Hull* 374; without locality, *Vasey* in 1889; Cape Horn, *Piper* 5026, 5027; Snipes Creek, *Cotton* 669½ in part.

Zonal distribution: Canadian?

18. Juncus longistylis Torr. Bot. Mex. Bound. 223. 1859.

Type locality: "Near the Copper Mines, New Mexico."

Range: Washington to Saskatchewan, south to California and New Mexico.

Specimens examined: Egbert Springs, *Sandberg & Leiberg* 360; Whitman County, *Lake & Hull* 374; along Wilson Creek, *Lake & Hull* 391; Medical Lake, *Henderson*, July, 1892; Marshall Junction, *Piper* 2280.

Zonal distribution: Arid Transition.

19. Juncus acuminatus Michx. Fl. **1**: 192. 1803.

Type locality: "In Carolina inferiore."

Range: British Columbia to Maine, south to Oregon and Georgia.

Specimens examined: Montesano, *Heller* 3969; Seattle, *Howell* 612; *Piper* 1135; Thurston County, *Henderson* 2556; Ilwaco, *Henderson* 2161; North Yakima, *Henderson* 2555; Atanum Soda Springs, *Watt* August, 1895; Samish Lake, *Suksdorf* 1013.

Zonal distribution: Transition.

20. Juncus richardsonianus Schult. in Roem. & Schult. Syst. **7**: 201. 1829.

Juncus alpinus insignis Fries; Engelm. Trans. St. Louis Acad. **2**: 459. 1866.

Type locality: "In sylvis Americae arcticae." Collected by Richardson.

Range: British Columbia to Nova Scotia, south to Washington, Nebraska and Pennsylvania.

Specimens examined: Whatcom County, *Gardner* 417; *Suksdorf* 1012; Chelan, *Elmer* 883.

21. Juncus oreganus S. Wats. Proc. Am. Acad. **23**: 267. 1888.

Juncus paucicapitatus Buch. Engler's Bot. Jahrb. **12**: 367. 1890.

Type locality: "In bogs at Ilwaco," Washington. Collected by Henderson.

Range: Alaska to Washington near the seacoast.

Specimens examined: Ilwaco, *Henderson*, September, 1892 and 15; Cascade Mountains, latitude 49°, *Lyall*; Ilwaco, *Piper*, June, 1904.

Zonal distribution: Humid Transition.

22. Juncus nodosus L. Sp. Pl. ed. 2. 466. 1762.

Type locality: "Habitat in America septentrionali."

Range: British Columbia to Nova Scotia, south to Nevada, Nebraska, and Virginia.

Specimens examined: Newport, *Piper* 4211; Colville, *Kreager* 519

Zonal distribution: Arid Transition.

23. Juncus torreyi Coville, Bull. Torr. Club **22**: 303. 1895.

Juncus nodosus megacephalus Torrey, Fl. N. Y. **2**: 326. 1843.

Juncus megacephalus Wood, Bot. ed. 2. 724. 1861, not Curtis 1835.

Type locality: "On the shores of Lake Ontario."

Range: British Columbia to New York, south to California and Texas.

Specimens examined: Coupeville, *Gardner* 312, Cascade Mountains, *Tweedy* in 1882; Parker, *Dunn*, August 11, 1901; Yakima, *Leckenby*, August, 1897; Loomis, *Elmer* 613; Colville, *Kreager* 519; Toppenish, *Cotton* 789; Prosser, *Cotton* 648.

Zonal distribution: Arid Transition and Upper Sonoran.

24. Juncus columbianus Coville, Proc. Biol. Soc. Wash. **14**: 87. 1901.

Type locality: "In wet meadows near Pullman, Washington." Collected by Elmer.

Range: Washington to Montana and Oregon.

Specimens examined: Wilson Creek, *Sandberg & Leiberg* 389; western Klickitat County, *Suksdorf* 462; Marshall Junction, *Piper* 2281; Spangle, *Suksdorf* 463; Pullman, *Piper* 3054, 3537; *Elmer* 235; Lake Chelan, *Lake & Hull* 389 in part, Snipes Creek, *Cotton* 669½ in part, 668.

Zonal distribution: Arid Transition.

25. Juncus suksdorfii Rydberg, Bull. Torr. Club **26**: 541. 1899.

Type locality: Falcon Valley, Klickitat County, Washington. Collected by Suksdorf.

Range: Eastern Washington, eastern Oregon, and adjacent Idaho.

Specimens examined: Falcon Valley, *Suksdorf* 217, 680; Spangle, *Suksdorf* 464; Pullman, *Piper* 1947, 3026, 3042, 3053; *Henderson* 2547, 2548.

Zonal distribution: Arid Transition.

26. Juncus badius Suksdorf, Deutsch. Bot. Monatss. **19**: 92. 1901.

Type locality: "Im Falkenthal im westl. Teil von Klickitat County," Washington.

Specimens examined: Falcon Valley, *Suksdorf* 2144; Kalispel Lake, *Kreager* 336.

Very close to *J. nevadensis* Wats. but to be distinguished by its relatively longer capsule.

The Falcon Valley specimen was the basis for the inclusion of *Juncus chlorocephalus* Engelm. in Suksdorf's list.

27. Juncus ensifolius Wiks. Kongl. Vet. Akad. Handl. **2**: 274. 1823.

Juncus xiphioides triandrus Engelm. Trans. St. Louis Acad. **2**: 482. 1868.

Juncus xiphioides macranthus Engelm. loc. cit.

TYPE LOCALITY: Not ascertained.

RANGE: Alaska southward in the mountains to California.

SPECIMENS EXAMINED: Montesano, *Heller* 3968; Seattle, *Piper* 1038; Skamania County, *Flett* 1388; Bridge Creek, *Elmer* 645; Lake Chelan, *Lake & Hull* 360; Nason City, *Sandberg & Leiberg* 608; Blue Mountains, *Piper* 2275; Pullman, *Piper* 1938; Stehekin, *Griffiths & Cotton* 193; Clealum Lake, *Cotton* 848; Cascade Mountains, latitude 49°, *Lyall;* Grays Harbor, *Wilkes Expedition* 237.

ZONAL DISTRIBUTION: Transition to Canadian.

27a. Juncus ensifolius major Hook. Fl. Bor. Am. **2**: 191. 1840.

Juncus xiphioides montanus Engelm. Trans. St. Louis Acad. **2**: 481. 1868.

Juncus saximontanus A. Nelson, Bull. Torr. Club. **29**: 401. 1902.

TYPE LOCALITY: "Sources of the Columbia River, in the Rocky Mountains."

RANGE: British Columbia to Oregon and Idaho.

SPECIMENS EXAMINED: Olympia, *Henderson*, October 2, 1892, Wenache, *Whited* 82, 207: Ellensburg, *Whited* 710; Blue Mountains, *Lake & Hull* 376; Silver Lake, *Henderson*, July 13, 1892; North Yakima, *Watt*, August, 1895.

28. Juncus oxymeris Engelm. Trans. St. Louis Acad. **2**: 483. 1868.

TYPE LOCALITY: "Sacramento Valley, Cal." Collected by Hartweg.

RANGE: Washington to California.

SPECIMENS EXAMINED: Seattle, *Piper*, July 4, 1897; *Smith* 1032.

ZONAL DISTRIBUTION: Humid Transition.

29. Juncus mertensianus Bong. Mem. Acad. St. Petersb. VI. **2**: 167. 1832.

TYPE LOCALITY: Sitka.

RANGE: Alaska to California and Colorado.

SPECIMENS EXAMINED: Clallam County, *Elmer* 2735, Olympic Mountains, *Flett* 827: Mount Rainier, *Piper* 1037; *Allen* 272, 273: *Smith*, August, 1890, Mount Stuart, *Elmer* 1131, Cascade Mountains, 49°, *Lyall* in 1860; Skamania County, *Suksdorf* 2042; *Flett* 1376; Klickitat River, *Flett* 1417, Wenache Region, *Brandegee* 676; Stevens Pass, *Whited*, August 27, 1901; Tieton River, *Cotton* 438; Skagit Pass, *Lake & Hull* 405; Bridge Creek, *Elmer* 650; Blue Mountains, *Piper* 2276, Kalispel Lake, *Kreager* 336.

ZONAL DISTRIBUTION: Arctic.

29a. Juncus mertensianus filifolius Suksdorf, Deutsch. Bot. Monatss. **19**: 92. 1901.

TYPE LOCALITY: "Skamania County," Washington.

JUNCOIDES. WOOD RUSH.

Flowers in clusters of 2 to 3 or solitary in an open panicle.
  Leaves 10 to 12 mm. broad; perianth brown, 3 to 3.5 mm. long.... **1. *J. glabratum*.**
  Leaves 6 to 8 or 10 mm. broad; perianth 1.5 to 2.5 long.
    Panicle rays drooping; leaves with a few pilose hairs at base.
      Flowers and capsules pale green; leaves thin, shining; seeds brown, ellipsoid.................................. **2. *J. parviflorum*.**
      Flowers and capsules dark brown; leaves thick, dull; seeds yellow constricted at each end...................... **3. *J. piperi*.**
    Panicle rays divaricate; leaves without pilose hairs......... **4. *J. divaricatum*.**
Flowers congested into 1 to several spike-like or head-like clusters.
  Inflorescence nodding, nearly always of a single spike-like cluster.. **5. *J. spicatum*.**
  Inflorescence of 2 to 12 globose or oblong clusters................ **6. *J. campestre*.**

1. **Juncoides glabratum** (Hoppe) Sheldon, Minn. Bot. Stud. Bull. **9**: 63. 1894.

Juncus glabratus Hoppe; Rostk. Mon. Junc. 27. 1801.

Luzula glabrata Desv. Journ. Botanique **1**: 145. 1808.

Luzula spadicea glabrata E. Meyer, Syn. Luz. 8. 1823.

TYPE LOCALITY: "Habitat in alpibus Salisburgensibus."

RANGE: British Columbia to Montana and Oregon. Europe.

SPECIMENS EXAMINED: Mount Rainier, *Piper* 2170; Mount Adams, *Henderson* 2546; mountains north of Ellensburg, *Brandegee* 1114; Cascade Mountains, *Tweedy* ——; Cascade Mountains above Lake Chelan, *T. E. Wilcox* in 1883; Cascade Mountains, Colville, *Lyall* in 1860; Nason City, *Sandberg & Leiberg* 668; Okanogan County, *Whited* 49; Mount Carlton, *Kreager* 232.

ZONAL DISTRIBUTION: Hudsonian.

2. **Juncoides parviflorum** (Ehrh.) Coville, Contr. Nat. Herb. **4**: 209. 1893.

Juncus parviflorus Ehrh. Beitr. **6**: 139. 1791.

Luzula parviflora Desv. Journ. Botanique **1**: 144. 1808.

Luzula spadicea laxiflora E. Meyer, Syn. Luz. 8. 1823.

TYPE LOCALITY: "Helvetia, Germania, Suecia."

RANGE: Alaska to Labrador, south to California, Minnesota, and New York.

SPECIMENS EXAMINED: Montesano, *Heller* 3900; Cascade Mountains, latitude 49°, *Lyall;* Mount Rainier, *Piper* 2171; Lake Cushman, *Henderson* 1016; Cascade Mountains, *Tweedy;* Chiquash Mountains, *Suksdorf* 1008; Seattle, *Piper* 1015; Skokomish Valley, *Kincaid;* Skagit Pass, *Lake & Hull* 409; Wind River, *Flett* 1392; Bridge Creek, *Elmer* 641; Okanogan County, *Lake & Hull* 400, 409; Southbend, *Spillman*, August 7, 1899.

ZONAL DISTRIBUTION: Humid Transition to Hudsonian.

A variable species not much different from the European *spadiceum*. Our common form has lax panicles and pale perianth segments and capsule, and is nearly the same as *Luzula parviflora·sparsiflora* Lange. The form with dark capsules, *Luzula parviflora melanocarpa* (Desv.) Gray, does not seem to occur in our limits.

3. **Juncoides piperi** Coville, sp. nov.

Densely tufted, from short horizontal usually matted rootstocks; stems erect, 10 to 35 cm. high; leaves mostly basal, firm in texture, pale green and dull, erect or nearly so, linear-lanceolate, attenuate, 2 to 4 mm. broad, 15 to 17-nerved, about one-fourth as long as the stem, smooth and glabrous except for a few long hairs on the sheaths and margins, inclined to become revolute; cauline leaves two or rarely three; panicle 5 to 8 cm. long, dark brown, nodding; lowest bract foliaceous, usually 8 to 15 mm. long; bractlets brown, paler and hyaline toward the apex, lacerate; flowers solitary on the branches or sometimes in clusters of two or three; perianth segments dark brown, nearly equal, ovate, acuminate, about 1.5 mm. long; stamens half to two-thirds the length of the perianth, the anthers nearly equaling the filaments; style about .2 to .3 mm., stigmas 2 to 3 mm. in length; capsule dark brown, exceeding the perianth, its valves broadly ovate, broadly acute, indistinctly or not at all apiculate; seeds of a light brown to buff or amber color, about 1.2 mm. in length, lanceolate-oblong in outline, narrowed to each end, distinctly keeled on the inner side, the cellular reticulations faint.

Type specimen United States National Herbarium no. 352425, collected in September, 1897, by A. D. E. Elmer (no. 678) in the Cascade Mountains of Okanogan County, Washington, on the north fork of Bridge Creek, growing "on dry sand-gravelly moraines just below the glaciers at 6,000 feet altitude."

This species differs from *Juncoides parviflorum* in its more densely tufted habit, smaller size, and more lacerate bractlets, thicker, never shining leaves, the lack of a distinct apiculation on the capsule valves, and the light-colored pointed seeds. In *parviflorum* the seeds are dark brown, narrowly oblong in outline, and blunt at the ends. Our species bears a superficial resemblance to the European *spadiceum*, but is readily distinguishable by its broader leaves and by its seed and capsule characters, which in *spadiceum* are the same as described above for *parviflorum*.

Juncoides piperi occurs on high peaks in the Cascade Mountains from northern Washington to southern Oregon, in the Olympic Mountains, and in the Cœur d'Alene Mountains of northern Idaho (*Leiberg* 1355), and appears to be associated with soils so porous as to be subject to great dryness in late summer. It is named for Professor C. V. Piper, who first pointed out its characters.

Specimens examined: Olympic Mountains, *Flett* 122; Horseshoe Basin, *Lake & Hull* 412; Bridge Creek, *Elmer* 678; Mount Rainier, *Tolmie; Piper* 2172½; *Allen* 44; Chiquash Mountains, *Suksdorf* 1009; Klickitat River, *Flett* 1364 in part.

Zonal distribution: Arctic.

4. Juncoides divaricatum (S. Wats.) Coville, Contr. Nat. Herb. **4**: 209. 1893.

Luzula divaricata S. Wats. Proc. Am. Acad. **14**: 302. 1879.

? *Luzula arcuata major* Hook. Fl. Bor. Am. **2**: 189. 1840.

Type locality: "California in the Sierra Nevada, mostly alpine, from above Mono Lake to Sierra County."

Range: Washington to California.

Specimens examined: Mount St. Helens, *Coville* 799.

The type of *Luzula arcuata major* Hook. was collected on Mount Rainier by Tolmie.

5. Juncoides spicatum (L.) Kuntze, Rev. Gen. Pl. **2**: 725. 1891.

Juncus spicatus L. Sp. Pl. **1**: 330. 1753.

Luzula spicata DC. Fl. Fr. **3**: 161. 1805.

Type locality: "Habitat in Lapponiae Alpibus."

Range: Alaska to Labrador, south to California, Colorado, and New York. Europe. Asia.

Specimens examined: Mount Rainier, *Piper* 2173; *Allen*; *Smith* 1014; Mount Stuart, *Elmer* 1123; *Brandegee* 339; Mount Adams, *Flett* 1404; Wenache Mountains, *Cotton* 1291.

Zonal distribution: Arctic.

6. Juncoides campestre (L.) Kuntze, Rev. Gen. Pl. **2**: 722. 1891.

Juncus campestris L. Sp. Pl. **1**: 329. 1753.

Luzula campestris DC. Fl. Fr. **3**: 161. 1805.

Luzula comosa E. Meyer, Syn. Luz. 21. 1823.

Type locality: Europe.

Range: Temperate North America. Europe. Asia.

Specimens examined: San Juan Island, *Lyall* in 1858; Coupeville, *Gardner* 301; Tacoma, *Flett* 202; Skamania County, *Flett* 1374; Klickitat River, *Flett* 1364 in part; Skokomish Valley, *Kincaid*, May 6, 1892; Mount Stuart, *Elmer* 1122; Falcon Valley, *Suksdorf* 2118; west Klickitat County, *Suksdorf* 2100; *Flett* 1364; Skagit Pass, *Lake & Hull* 415; Pend Oreille River, *Lyall* in 1861; Cascade Mountains, *Tweedy* 28; Hangman Creek, *Sandberg & Leiberg* 19; Kamiak Butte, *Elmer* 805; Blue Mountains, *Lake & Hull* 380; *Piper*, July, 1896; Nisqually Valley, *Allen* 160.

Zonal distribution: Transition.

LILIACEAE. Lily Family.

Bracts of the inflorescence scarious.
    Flowers in racemes.................................. Quamasia (p. 190).
    Flowers not in racemes.
        Odor onion-like; flowers in umbels..................... Allium (p. 187).
        Odor not onion-like; flowers in umbels or corymbs...... Hookera (p. 189)
Bracts of the inflorescence foliaceous or none.
    Perianth segments unlike, the outer much narrower......... Calochortus (p. 193)
    Perianth segments similar.

- Bulbs scaly; anthers versatile.
  - Nectary a linear groove; perianth not campanulate. LILIUM (p. 191).
  - Nectary a shallow pit; perianth campanulate...... FRITILLARIA (p. 191).
- Bulbs corm-like; anthers not versatile.
  - Leaves only two, rather broad.................. ERYTHRONIUM (p. 192).
  - Leaves several, narrow, grass-like................ LLOYDIA (p. 193).

ALLIUM. ONION.

- Bulbs oblong, cespitose, more or less rhizomatous.
  - Leaves linear.. 1. *A. sibiricum.*
  - Leaves flat or channelled.
    - Rhizome stout; flowers erect.......................... 2. *A. validum.*
    - Rhizome scarcely developed; flowers nodding............ 3. *A. cernuum.*
- Bulbs globose, loosely cespitose or solitary, not rhizomatous.
  - Bulb coats fibrous...................................... 4. *A. geyeri.*
  - Bulb coats not fibrous, usually reticulate.
    - Flowers red.
      - Leaves flat, rather broad; reticulations wanting.
        - Plants tall, 20 to 40 cm. high; umbel globose, dense; scape terete........................... 5. *A. douglasii.*
        - Plants low, 5 to 10 cm. high; scape flattened.
          - Leaves 2 to 3 mm. broad; scapes smooth.... 6. *A. tolmiei.*
          - Leaves 1 to 1.5 mm. wide; scapes crenulate.. 7. *A. crenulatum.*
      - Leaves narrow; reticulations evident.
        - Reticulations polygonal, distinct; petals 10 to 14 mm. long, serrulate........................... 8. *A. acuminatum.*
        - Reticulations obscure, transversely-oblong or wanting; petals entire, 6 mm. long................. 9. *A. nevii.*
    - Flowers white.
      - Scape tall; umbel dense, globose; reticulations narrow, transverse, sinuous................................ 10. *A. attenuifolium.*
      - Scape low; umbel flat.
        - Reticulations none............................ 11. *A. macrum.*
        - Reticulations narrow; very cernuous............ 12. *A. collinum.*

1. **Allium sibiricum** L. Mant. 562. 1767.

TYPE LOCALITY: Siberia.

RANGE: Alaska to New Brunswick, south to Oregon and Minnesota.

SPECIMENS EXAMINED: Wenache, *Whited* 26; Lake Wenache, *Sandberg & Leiberg* 630; White Bluff Ferry, *Lake & Hull*, August 9, 1892; Fort Colville, *Lyall* in 1861; Walla Walla, *Tolmie.*

ZONAL DISTRIBUTION: Arid Transition.

2. **Allium validum** S. Wats. Bot. King. Explor. 350. 1871.

TYPE LOCALITY: Mono Pass, California. Collected by Bolander.

RANGE: Washington to California and Nevada.

SPECIMENS EXAMINED: Mount Rainier, *Flett* 275.

ZONAL DISTRIBUTION: Hudsonian.

3. **Allium cernuum** Roth, Roem. Archiv. I 2: 40. 1798.

Allium recurvatum Rydberg, Mem. N. Y. Bot. Gard. 1. 94. 1900.

TYPE LOCALITY: None given.

RANGE: British Columbia to Oregon and Texas, and in the Allegheny Mountains.

SPECIMENS EXAMINED: Clallam County, *Elmer* 2506; Olympic Mountains, *Flett* 822; East Sound, *Henderson*, July 3, 1892; Bellingham Bay, *Suksdorf* 1005; Fairhaven, *Piper*

2803; Fidalgo City, *Flett* 2109; Goat Mountains, *Allen* 81; Snoqualmie Falls, *Piper* 671: White Bluff Ferry, *Lake & Hull*, August 11, 1892; Fort Colville, *Lyall* in 1860; Wenache, *Whited* 1420; Chelan, *Elmer* 504; Meyers Falls, *Kreager* 594.

Zonal distribution: Transition.

4. Allium geyeri S. Wats. Proc. Am. Acad. **14**: 227. 1879.

Type locality: The type specimen was collected by Geyer "on stony banks of the Kooskooskia River [Idaho]." The omoir of the Nez Perce Indians.

Range: Washington, Idaho, Oregon, and British Columbia.

Specimens examined: Ellensberg, *Whited* 508; *Piper*, May 21, 1897; Prosser, *Henderson* 26; Mabton, *Cotton* 367; between Coulee City and Waterville, *Spillman*, May 27, 1896; Spokane, *Piper* 2272, 2722; Coulee City, *Piper* 3853; Sprague, *Sandberg & Leiberg* 146; Pullman, *Elmer* 834; Union Flat, *Piper* 1850; without locality, *Vasey;* Cape Horn, *Piper* 5073.

Zonal distribution: Arid Transition.

This species was referred to *A. reticulatum* Don in Hooker's Flora.

5. Allium douglasii Hook. Fl. Bor. Am. **2**: 184. *t. 196*. 1838.

Allium hendersoni Robinson & Seaton, Bot. Gaz. **18**: 237. 1893.

Type locality: "Northwest coast on the low hills, Douglas," according to Hooker, but Douglas' label reads "Subalpine hill near Kettle Falls in the Blue Mountains, 1826." Kettle Falls is in Stevens County, Wash.

Range: Eastern Washington and adjacent Idaho.

Specimens examined: Spangle, *Piper*, June, 1899; Union Flat, *Lake & Hull* 621; *Piper* 1870; Blue Mountains, *Horner* 465; *Piper*, July, 1896.

Zonal distribution: Arid Transition.

6. Allium tolmiei Baker, Bot. Mag. under *pl. 6227*. 1876.

Allium douglasii β Hook. Fl. Bor. Am. **2**: 185. 1839.

Type locality: "In the Snake Country, Tolmie."

Range: Washington to Utah.

Specimens examined: Opposite Umatilla, *Howell*, April 26, 1882; Wallula, *Suksdorf* 2006.

The last-cited specimen is the basis of the inclusion of *Allium cusickii* in Suksdorf's List.

7. Allium crenulatum Wiegand, Bull. Torr. Club **26**: 135. 1899.

Type locality: "Loose gravel near the summit of the Olympic Mountains in the vicinity of the headwaters of the Quileene River."

Range: Olympic Mountains, Washington.

Specimens examined: Olympic Mountains, *Flett* 821; Mount Steele, *Piper* 2218; Baldy Peak, *Lamb* 1330.

Zonal distribution: Arctic.

8. Allium acuminatum Hook. Fl. Bor. Am. **2**: 184. 1838.

Type locality: "Nootka Sound, plentiful." Collected by Menzies.

Range: British Columbia to California and Utah

Specimens examined: Challam County, *Elmer* 2499; Olympic Mountains, *Flett* 86; Fidalgo Island, *Flett* 2106; Admiralty Head, *Piper*, May 27, 1898; Coupeville, *Gardner* 286; Naches, *Lyall* in 1860; Mount Stuart, *Elmer*, August, 1898; near Mount Adams, *Flett* 1117; Peshastin, *Sandberg & Leiberg* 498; Klickitat River, *Flett* 1115; Tieton River, *Cotton* 442; North Yakima, *Henderson*, May 29, 1892; Ellensburg, *Elmer* 397; Skagit Pass, *Lake & Hull*, August 24, 1892; Crab and Wilson creeks, *Sandberg & Leiberg* 273; Pullman, *Piper* 1685; without locality, *Vasey* 92.

Zonal distribution: Transition.

8a. Allium acuminatum cuspidatum Fernald, Zöe **4**: 380. 1894.

Type locality: Wawawai, Washington. Collected by W. R. Hull.

Range: Eastern Washington.

Specimens examined: Wawawai, *Hull* 619; Clarks Springs, *Kreager* 12.

9. **Allium nevii** S. Wats. Proc. Am. Acad. **14**: 231. 1879.

Type locality: Hood River, Oregon. Collected by Nevius.

Range: Washington and Oregon.

Specimens examined: Klickitat, *Howell*, June, 1879; Klickitat River, *Flett*, 1116; Falcon Valley, *Suksdorf* 42; Yakima County, *Henderson* 2480, 2481; Wenache Mountains, *Elmer* 458; Sprague, *Sandberg & Leiberg* 205; *Henderson* 2479; Wilson Creek, *Sandberg & Leiberg*, June, 1893; without locality, *Vasey* 91; Wenache Mountains, *Cotton* 1284.

Zonal distribution: Arid Transition.

10. **Allium attenuifolium** Kellogg, Proc. Cal. Acad. **2**: 110. 1858–62.

Type locality: Mt. Shasta, California.

Range: Washington to California.

Specimens examined: Klickitat County, *Suksdorf* 60.

11. **Allium macrum** S. Wats. Proc. Am. Acad. **14**: 233. 1879.

Type locality: "Union County, Oregon, on rocky hills." Collected by Cusick.

Range: Blue Mountains of Washington and Oregon.

Specimens examined: Blue Mountains, *Piper* 2325.

Zonal distribution: Hudsonian.

12. **Allium collinum** Dougl.; S. Wats. Proc. Am. Acad. **14**: 228. 1879.

Allium fibrillum Jones, Contr. Western Bot. **10**: 24. 1902.

Type locality: "Abundant on the Blue Mountains." Collected by Douglas.

Specimens examined: Blue Mountains, *Horner* 190, 193, 470.

Allium scilloides Dougl.[a], collected by Douglas, at "Priest's Rapids, Columbia River," has not been recognizable from Watson's very brief description.

HOOKERA.

- Anther-bearing stamens 3.
  - Flowers in umbels, long-pedicelled .... 1. *H. coronaria.*
  - Flowers nearly sessile in a very short raceme .... 2. *H. pulchella.*
- Anther-bearing stamens 6.
  - Stamens in one row; flowers whitish .... 3. *H. hyacinthina.*
  - Stamens in two rows; flowers blue or purplish.
    - Filament of inner stamens narrow .... 4. *H. douglasii.*
    - Filament of inner stamens broad.
      - Corolla lobes much shorter than the tube .... 5. *H. bicolor.*
      - Corolla lobes about as long as the tube .... 6. *H. howellii.*

1. **Hookera coronaria** Salisb. Par. Lond. *pl.* *98.* 1806.

Brodiaea grandiflora Smith, Trans. Linn. Soc. **10**: 2. 1811.

Type locality: "In California."

Range: British Columbia to California west of the Cascades and Sierras.

Specimens examined: Fidalgo Island, *Flett* 2104; Whidby Island, *Gardner* 284; near Satsop, *Heller* 4031; Lake Park, *Piper* 2093; Tacoma, *Flett* 906; Gate City, *Henderson*, June, 1892; Fort Vancouver, *Tolmie;* Stuart Island, *Lawrence* 27.

Zonal distribution: Humid Transition.

2. **Hookera pulchella** Salisb. Par. Lond. under *pl.* *98.* 1806.

Brodiaea congesta Smith, Trans. Linn. Soc. **10**: 3. *pl.* *1.* 1811.

Dichelostemma congestum Kunth, Enum. Pl. **4**: 470. 1843.

Type locality: "In California."

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[a] Wats. Proc. Am. Acad. **14**: 229. 1879.

RANGE: Washington to California west of the Cascades and Sierras.

SPECIMENS EXAMINED: Whidby Island, *Gardner* 283; Fourth Plain, *Piper*, July 14, 1899; Alki Point, *Piper* in 1888; Cape Horn, *Piper* 4982.

ZONAL DISTRIBUTION: Humid Transition.

3. **Hookera hyacinthina** (Lindl.) Kuntze, Rev. Gen. Pl. **2**: 712. 1891.

Hesperochordon hyacinthinum Lindl. Bot. Reg. **15**: under *t. 1293*. 1829.

Hesperochordum lacteum Lindl. Bot. Reg. **19**: *t. 1639*. 1833.

Hesperochordon lewisii Hook. Fl. Bor. Am. **2**: 185. *t. 198*. 1839.

Brodiaea lactea Wats. Proc. Am. Acad. **14**: 238. 1879.

TYPE LOCALITY: "Native of the plains of the Missouri and of the north-west of America, in which last country it was found by Mr. Douglas."

RANGE: British Columbia to California and Idaho.

SPECIMENS EXAMINED: Humptulips, *Lamb* 1282; Muckleshoot, *Dr. Ruhn;* Whidby Island, *Gardner* 282; Fidalgo City, *Flett* 2107; Admiralty Head, *Piper*, May, 1898; Tieton River, *Cotton* 450; Mount Stuart, *Elmer* 1208; Peshastin, *Sandberg & Leiberg*, July, 1893; Pullman, *Piper* 1679, July, 1893; *Lake* 617; without locality, *Vasey* in 1889.

ZONAL DISTRIBUTION: Transition.

4. **Hookera douglasii** (S. Wats.).

Brodiaea grandiflora Smith, err. det. Pursh, Fl. **1**: 223. 1814.

Triteleia grandiflora Lindl. Bot. Reg. 15 under *t. 1293*. 1829.

Brodiaea douglasii S. Wats. Proc. Am. Acad. **14**: 237. 1879.

TYPE LOCALITY: "Northwest America." Collected by Douglas.

RANGE: British Columbia to Utah and Wyoming, probably only to the eastward of the Cascade Mountains.

SPECIMENS EXAMINED: Tampico, *Flett* 1121; Klickitat River, *Flett* 1409; Spokane, *Sandberg & Leiberg* 71; Spokane County, *Suksdorf* 455; Hangman Creek, *Sandberg & Leiberg* 71; Pullman, *Piper*, July, 1893; Wawawai, *Piper* 1671; without locality, *Vasey* 87.

ZONAL DISTRIBUTION: Arid Transition.

5. **Hookera bicolor** (Suksdorf.)

Brodiaea bicolor Suksdorf, West. Am. Sci. **14**: 2. 1902.

TYPE LOCALITY: "In Falkenthal (Falcon Valley), Klickitat County, Washington." Collected by Suksdorf.

RANGE: Eastern Washington.

SPECIMENS EXAMINED: Wenache, *Whited* 1049; North Yakima, *Henderson* 2406; without locality, *Vasey* in 1889.

6. **Hookera howellii** (S. Wats.).

Brodiaea howellii S. Wats. Proc. Am. Acad. **14**: 301. 1879.

TYPE LOCALITY: "Klickitat County," Washington. Collected by Joseph Howell.

RANGE: Washington.

SPECIMENS EXAMINED: Whidby Island, *Gardner* 285. Tacoma, *Flett*, June, 1896. Klickitat County, *Howell*, June, 1879; Falcon Valley, *Suksdorf* 506, 62; Ellensburg, *Piper*, May, 1896.

ZONAL DISTRIBUTION: Transition.

QUAMASIA. CAMAS.

Perianth irregular, the segments 3 or sometimes 5-nerved; buds gibbous on one side.. 1. *Q. quamash*.

Perianth regular, the segments 5 to 9-nerved.

Segments usually 7-nerved; capsules conspicuously nerved; flowers blue or white.. 2. *Q. leichtlinii*.

Segments usually 5-nerved; capsules not conspicuously nerved: flowers blue.. 3. *Q. suksdorfii*.

1. **Quamasia quamash** (Pursh) Coville, Proc. Biol. Soc. Wash. **11**: 64. 1897. Camas.
Phalangium quamash Pursh, Fl. **1**: 226. 1814.
Camassia esculenta Lindl. Bot. Reg. **18**. *t. 1486*. 1832.

Type locality: On the Quamash Flats, that is Weippe, Idaho. Collected by Lewis.

Range: British Columbia to Montana, Utah, and California.

Specimens examined: Falcon Valley, *Suksdorf* 508, 63; Muckleshoot, *Dr. Ruhn;* Fort Vancouver, *Garry* in 1826; Ellensburg, *Whited*, May 17, 1901; Klickitat River, *Flett* 1119; without locality, *Vasey* 101; Spokane, *Sandberg & Leiberg* 57; Pullman, *Hull* 622; *Piper* 1677, June, 1894; *Elmer* 821; Union Flat, *Piper*, May, 1897; Blue Mountains, *Piper*, July, 1896.

Zonal distribution: Transition.

2. **Quamasia leichtlinii** (Baker) Coville, Proc. Biol. Soc. Wash. **11**: 63. 1897.
Camassia esculenta leichtlinii Baker, Bot. Mag. *t. 6287*. 1877.
Camassia leichtlinii Wats. Proc. Am. Acad. **20**: 376. 1885.
Chlorogalum leichtlinii Baker, Gard. Chron. n. ser. **1**: 689. 1874.

Type locality: British Columbia. Collected by Jeffrey.

Range: British Columbia to Washington west of the Cascade Mountains.

Specimens examined: Cascade Mountains, latitude 49°, *Lyall* in 1859; Admiralty Head, *Piper*, April, 1898.

Zonal distribution: Humid Transition.

3. **Quamasia suksdorfii** (Greenm.) Piper.
Camassia suksdorfii Greenm. Bot. Gaz. **34**: 307. 1902.

Type locality: Falcon Valley.

Specimens examined: Falcon Valley, *Suksdorf* 251, 509; near Bingen, *Suksdorf* 2663.

LILIUM. Lily.

1. **Lilium parviflorum** (Hook.) Holzinger, Contr. Nat. Herb. **3**: 253. 1895.
Lilium canadense parviflorum Hook. Fl. Bor. Am. **2**: 181. 1838.
Lilium columbianum Hanson; Baker, Journ. Linn. Soc. **14**: 243. 1875.
Lilium bakerii Purdy, Erythea **5**: 104. 1897.

Type locality: "N. W. Coast, Columbia and Walamet Rivers." Collected by Douglas and by Tolmie.

Range: British Columbia to North California, not east of the Cascade Mountains.

Specimens examined: Cascade Mountains, *Lyall* in 1860; *Harford & Dunn*, May 27, 1869; Clallam County, *Elmer* 2502; Olympic Mountains, *Sargent*, August 15, 1896; Montesano, *Heller* 3972; Silverton, *Bouck* 187; Chehalis County, *Lamb* 1179; *Pringle*, June 27, 1877; Chehalis River, *Lamb* 1237; Twisp River, *Whited* 176; Mount Rainier, *Piper*, August, 1895; Seattle, *Piper*, July, 1895; Tacoma, *Flett* 124; Peshastin, *Sandberg & Leiberg* 533; Skagit Pass, *Lake & Hull*, August, 1892; Stevens Pass, *Sandberg & Leiberg* 740; Wenache Mountains, *Whited* 1178; Falcon Valley, *Suksdorf* 511; Roslyn, *Whited* 462; Stehekin, *Griffiths & Cotton* 226.

Zonal distribution: Humid Transition.

Cooper referred this lily to the eastern *L. canadense* L.

FRITILLARIA.

Flowers yellow; styles connate to the summit .... 1. *F. pudica.*
Flowers brownish purple; styles distinct to the middle.
    Capsules acutely angled; flowers much mottled .... 2. *F. lanceolata.*
    Capsules obtusely angled; flowers obscurely mottled .... 3. *F. camtschatcensis.*

1. **Fritillaria pudica** (Pursh) Spreng. Syst. **2**: 64. 1825.
Lilium? pudicum Pursh, Fl. **1**: 228. *t. 8*. 1814.

TYPE LOCALITY: "On the headwaters of the Missouri," according to Pursh, but this is probably an error, as the Lewis specimen in the Philadelphia Academy is from the Kooskooskee [Clearwater] River, Idaho.

RANGE: British Columbia to California and Utah.

SPECIMENS EXAMINED: Klickitat River, *Flett* 1114; White Salmon, *Suksdorf* 313; Wenache, *Whited* 2, 1009; Clealum, *Henderson* in 1892; Fort Colville, *Lyall* in 1861; Spokane, *Sandberg & Leiberg* 74; Pullman, *Piper*, July, 1893, 1673; *Moore*, May, 1893.

ZONAL DISTRIBUTION: Arid Transition.

2. Fritillaria lanceolata Pursh, Fl. **1**: 230. 1814.

TYPE LOCALITY: "On the headwaters of the Missouri and Columbia." Collected by Lewis. The Columbia specimen in the Philadelphia Academy is from Brant Island at the foot of the Cascades. The Missouri River locality is probably erroneous, as it is out of the known range of the plant.

RANGE: British Columbia to California eastward to western Idaho.

SPECIMENS EXAMINED: Clallam County, *Elmer* 2507; Orchard Point, *Piper*, July, 1895; Orcas Island, *Henderson*, July, 1892; Admiralty Head, *Piper*, April, 1898; Tacoma, *Flett* 71; Roslyn, *Whited* 359; Peshastin, *Sandberg & Leiberg* 534; White Salmon, *Suksdorf* 312; Major Creek, *Suksdorf*, June 4, 1886; Semiamoo Bay, *Lyall* in 1858; Goat Mountains, *Allen* 235; Twisp River, *Whited*, July 16, 1896; without locality, *Vasey* 88, 90.

ZONAL DISTRIBUTION: Transition.

3. Fritillaria camtschatcensis (L.) Ker-Gawl. Bot. Mag. **30**: under *t. 1216*. 1809.

Lilium camtschatcense L. Sp. Pl. **1**: 303. 1753.

TYPE LOCALITY: "Habitat in Canada, Camschatca."

RANGE: Alaska to Washington. Kamchatka.

SPECIMENS EXAMINED: Whidby Island, *Gardner* 281; Silverton, *Bouck* 1, 188.

ZONAL DISTRIBUTION: Canadian?

ERYTHRONIUM. ADDER'S TONGUE.

- Leaves mottled; flowers cream-color .... 1. *E. giganteum*.
- Leaves not mottled.
  - Flowers white; filaments filiform .... 2. *E. montanum*.
  - Flowers yellow.
    - Anthers purple .... 3. *E. grandiflorum*.
    - Anthers white .... 4. *E. parviflorum*.

1. Erythronium giganteum Lindl. Bot. Reg. **21**: under *t. 1786*. 1835.

Erythronium grandiflorum albiflorum Hook Fl. Bor. Am. **2**: 182. 1839.

TYPE LOCALITY: "North West America."

RANGE: British Columbia to Oregon west of the Cascade Mountains.

SPECIMENS EXAMINED: Whidby Island, *Gardner* 289; Admiralty Head, *Piper*, April, 1898; Chimacum, *Binns*, June 30, 1889; Seattle, *Piper*, April, 1889; *Smith*, April, 1889; Clarke County, *Suksdorf* 2327; without locality, *Henderson*, May, 1892.

ZONAL DISTRIBUTION: Humid Transition.

Our plant is clearly the *E. giganteum* figured in Curtis's Botanical Magazine (*pl. 5714*) which Hooker suspects is the *E. giganteum* Lindl.

We incline to the belief that the *E. revolutum* Smith,[a] collected by Menzies on "King George's Sound" is the plant here called *E. giganteum*. But Mr. Carl Purdy retains that name for a closely allied species ranging from the Columbia River to Mendocino County, California, which may also range up the Washington coast to the vicinity of "King George's Sound," i. e., the Gulf of Georgia.

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[a] Rees' Cyclopedia **13**: no. 3. 1809.

2. **Erythronium montanum** S. Wats. Proc. Am. Acad. **26**: 130. 1891.

TYPE LOCALITY: "Mt. Hood, Mt. Adams, etc."

RANGE: Cascade Mountains of Washington and Oregon; Olympic Mountains.

SPECIMENS EXAMINED: Clallam County, *Elmer* 2496; Olympic Mountains, *Piper*, 2220; *Henderson* 2038; Mount Rainier, *Piper* 2118; Paradise Valley, *Flett* 256; Goat Mountains, *Allen* 83; Skamania County, *Suksdorf*, August 11, 1886; Mount Adams, *Suksdorf* 456.

ZONAL DISTRIBUTION: Hudsonian.

3. **Erythronium grandiflorum** Pursh, Fl. 1: 231. 1814.

Erythronium grandiflorum minus Hook. Fl. Bor. Am. **2**: 182. 1839.

TYPE LOCALITY: "On the Kooskooskee," Idaho. Collected by Lewis. The exact spot is opposite the present town of Kamiah.

RANGE: British Columbia to Oregon and Idaho.

SPECIMENS EXAMINED: Fort Colville, *Lyall* in 1861; Pullman, *Piper* 1676, June, 1893.

ZONAL DISTRIBUTION: Arid Transition.

4. **Erythronium parviflorum** (S. Wats.) Goodding, Bot. Gaz. **33**: 67. 1902.

Erythronium grandiflorum parviflorum S. Wats. Proc. Am. Acad. **26**: 129. 1891.

TYPE LOCALITY: "In the mountains from Colorado and northern Utah to British America, in the Blue Mountains of Oregon and in the Cascades of Washington and British Columbia."

RANGE: British Columbia to Montana and Colorado.

SPECIMENS EXAMINED: Clallam County, *Elmer* 2491; Olympic Mountains, *Henderson* 2039?; Silverton, *Bouck* 189; Mount Rainier, *Piper*, 2100; *Flett* 260; Goat Mountains, *Allen* 82; Klickitat River, *Flett* 1118; near Mount Adams, *Henderson*, August, 1892; near Ellensburg, *Whited*, April, 1897; Simcoe Mountains, *Howell* in 1879; Wenache Mountains, *Whited* 1053; Blue Mountains, *Piper*, July, 1896.

ZONAL DISTRIBUTION: Hudsonian.

LLOYDIA.

1. **Lloydia serotina** (L.) Sweet, Hort. Brit. ed. 2. 527. 1830.

Anthericum serotinum L. Sp. Pl. ed. 2. 1: 444. 1762.

Lloydia alpina Salisb. Trans. Hort. Soc. Lond. 1: 328. 1812.

TYPE LOCALITY: "Habitat in alpibus Angliae, Helvetiae, Taureri rastadiensis, Wallaesiae."

RANGE: Arctic regions, southward in the mountains to Washington, Nevada, and Colorado. Europe.

SPECIMENS EXAMINED: Olympic Mountains, *Flett* 850; Mount Baker, *Flett* 861; Mount Baldy, *Conard* 285.

ZONAL DISTRIBUTION: Arctic.

CALOCHORTUS.

Flowers pink or purple, erect.
  Petals acute or acuminate, yellow at base .... 1. *C. macrocarpus.*
  Petals obtuse or truncate, ocellate at base.
    Flowers 2 to 2.5 cm. long; petals denticulate .... 2. *C. longebarbatus.*
    Flowers 3 to 4 cm. long; petals entire .... 3. *C. nitidus.*
Flowers white or yellowish, nodding.
  Petals pale yellow, sparsely hairy inside; gland naked .... 4. *C. apiculatus.*
  Petals white, very hairy inside, broadly ovate; gland more or less covered by a scale.
    Petals obtuse; pods nodding.
      Stems 5 to 15 cm. high; scale deeply lacerate........ 5. *C. elegans.*
      Stems 20 to 40 cm. high; scales subentire.

Sepals each with a conspicuous purple pit at base; anthers caudate at apex .... 8. *C. subalpinus*.
Sepals without pit at base; anthers merely acuminate .... 6. *C. purdyi*.
Petals narrowly ovate, acute; pods erect .... 7. *C. lyallii*.

1. **Calochortus macrocarpus** Dougl. Trans. Hort. Soc. **7**: 276. *t. 8*. 1830.

Type locality: "Dry barren grounds around the Great Falls of the Columbia, and on the summit of the low hills between them and the Grand Rapids." Collected by Douglas, June, 1825.

Range: British Columbia to Idaho and California.

Specimens examined: White Salmon, *Suksdorf* in 1879; Simcoe Hills, *Lyall* in June, 1860; Egbert Springs, *Sandberg & Leiberg* 409; without locality, *Vasey* 83; *Kreager* 391; Ellensburg, *Elmer* 393; near Ellensburg, *Whited* 539; *Piper*, July, 1897; Wenache, *Whited* 1269; Cowiche Creek, *Cotton* 462; Spokane County, *Mrs. Tucker;* Spokane, *Piper*, July, 1894; Steamboat Rock, *McKay* 21; Alkali Lake, *Sandberg & Leiberg*, July, 1892; Pullman, *Lake & Hull*, July, 1892; *Piper* 1681; Waitsburg, *Horner* 463; Illia, *Lake & Hull*, June 1892.

Zonal distribution: Upper Sonoran and Arid Transition.

2. **Calochortus longebarbatus** S. Wats. Proc. Am. Acad. **17**: 381. 1882.

Type locality: Falcon Valley, Klickitat County, Washington. Collected by Suksdorf

Range: Klickitat County and adjacent Oregon.

Specimens examined: White Salmon, *Suksdorf* in 1879; Falcon Valley, *Suksdorf* 64; Klickitat Valley, *Howell* 560; Klickitat River, *Flett* 1123.

This species differs constantly from *C. nitidus* in producing a bulblet on the stem at the surface of the ground.

3. **Calochortus nitidus** Dougl. Trans. Hort. Soc. **7**: 277. *t. 9*. 1830.

Calochortus pavonaceus Fernald, Bot. Gaz. **19**: 335. 1894.

Type locality: "On the chain of the Blue Mountains and mountainous districts of the Columbia, from the confluence of the Spokane River upwards." Collected by Douglas.

Range: Eastern Washington and adjacent Idaho.

Specimens examined: Pullman, *Piper* 1680; *Henderson* 2484; Union Flat, *Lake & Hull* 618.

Zonal distribution: Arid Transition.

4. **Calochortus apiculatus** Baker, Journ. Linn. Soc. **14**: 305. 1875.

Type locality: "Columbia brittanica ad montes Pend Oreille et Kootenay." Collected by Lyall. This must be very close to where Washington, Idaho, and British Columbia meet.

Range. Washington, Idaho, and British Columbia.

Specimens examined: Spokane, *Miss Kate Reed;* Pend Oreille and Kootenay rivers, *Lyall* in 1861.

Zonal distribution: Canadian.

5. **Calochortus elegans** Pursh, Fl. **1**: 240. 1814.

Calochortus elegans minor Hook. Fl. Bor. Am. **2**: 183. 1839.

Calochortus elegans major Hook. loc. cit.

Type locality. "On the headwaters of the Kooskooky," Idaho. Collected by Lewis. The exact place is opposite Kamiah, Idaho.

Range: Washington, Idaho.

Specimens examined: Pullman, *Hull* 811; *Henderson* 2483; Wenache, *Whited* 40, 1139.

Zonal distribution: Arid Transition to Canadian.

Small specimens of this species have been referred erroneously to *C. elegans nanus* Wood.

6. Calochortus purdyi Eastwood, Proc. Cal. Acad. III. **1**: 137. 1898.

Type locality: Grants Pass, Oregon, Collected by Howell.

Range: Western Washington and western Oregon.

Specimens examined: Seattle, *Piper*, June 4, 1883; *Meany*, June, 1885.

Zonal distribution: Humid Transition.

7. Calochortus lyallii Baker, Journ. Linn. Soc. **14**: 305. 1875.

Calochortus ciliatus Robinson & Seaton, Bot. Gaz. **18**: 238. 1893.

Type locality: "Columbia brittanica ad apicem mont's alt. 5,800 pedes inter fluv. Columbia et Yakima." Collected by Lyall.

Range: Eastern Washington, in the Cascade Mountains.

Specimens examined: Naches River, *Henderson* 2485; Mount Stuart, *Sandberg & Leiberg* 575; Wenache Mountains, *Whited* 1139, 40; *Cotton* 1266, 1313, 1657; Wenache region, *Brandegee* 1107; without locality, *Vasey* 82.

Zonal distribution: Hudsonian.

A specimen of *E. ciliatus* from the Wenache Mountains, the type locality for each supposed species, was sent to Mr. J. G. Baker, who reports that it "is not exactly the same" as the type of *C. lyallii*, "as it differs in the relative length of anther to filament." A fairly large series of specimens convinces me that two species can not be maintained as distinct on such a basis.

8. Calochortus subalpinus sp. nov.

Bulbs ovate, 2 to 3 cm. long, the outer coats dark; stems flexuous, erect, 15 to 20 cm. high, usually exceeded by the solitary leaf, 1 to 3-flowered; leaf linear-lanceolate, acuminate, 3 to 8 mm. wide, paler beneath; bracts lanceolate, long-acuminate, 2 to 3 cm. long; sepals lance-ovate, acuminate, somewhat scarious on the margins, 1.5 to 2.5 cm. long, 6 to 9-nerved, the base strongly arched forming a shallow pit inside, this marked by a purple spot; petals cream-colored, purplish at base, obovate or rhombic-orbicular, 2 to 3 cm. long, slightly erose at margin, sparsely villous over the upper face above the striate minutely puberulent gland excepting a narrow portion near the apex; scale narrow, entire, extending in a gentle curve nearly across the petal and covered with long, retrorse hairs; filaments broadly wing-margined, equalling the long-beaked anthers; capsules nodding, narrowly elliptic, rather acutish at each end, 2 to 3 cm. long, beaked by a style 1 to 2 mm. long.

A subalpine species closely allied to *C. purdyi* Eastwood, which differs in having thinner sepals lacking the pit at the base, more villous petals without the naked apical area, less villous scales which are very strongly arched, a much thinner perfectly smooth gland, and merely acuminate, not beaked, anthers.

Specimens examined: Washington: Mount St. Helens, *Coville* 765, July 18, 1898; Mount Adams, *Henderson* 52; Klickitat River, *Flett* 1121; Skamania County, *Suksdorf*, August 11, 1886; White Salmon, *Suksdorf* in 1879; Falcon Valley, *Suksdorf*, July 1, August 1881.

Oregon: Mount Hood, *A. Wood* in 1866; *Gorman*, September 23, 1896; *Dr. C. H. Merriam*, altitude 6,000 to 7,000 feet in 1896; *Howell* in 1881 (type, in U. S. National Herbarium); Three Sisters, *Gorman* 121, July 21, 1903, altitude 6,000 feet.

This species was included in *C. elegans nanus* Wood by its author, but the type of that came from near Yreka, California, and is quite different from this subalpine or alpine northern species. In Howell's Flora of Northwest America this species is well described, but under the name *C. lyallii* Baker, which belongs to a very different species. The species has also been confused with *C. apiculatus* Baker.

MELANTHACEAE. Bunch-flower Family.

Anthers 1-celled; leaves neither rigid nor equitant.

Leaves broad; petioles sheathing; flowers in a large panicle.. Veratrum (p. 196).

Leaves narrow, grass-like.

Flowers erect, each segment bearing a gland at base... ZYGADENUS (p. 197).
Flowers nodding; perianth segments glandless......... STENANTHIUM (p. 197.).
Anthers 2-celled; leaves rigid or equitant.
Leaves equitant; pedicels bracteolate..................... TOFIELDA (p. 196).
Leaves not equitant, harsh and rigid; pedicels naked....... XEROPHYLLUM (p. 197).

VERATRUM. FALSE HELLEBORE.

Flowers green; panicle drooping.................................. 1. *V. viride.*
Flowers white; panicle erect.
Terminal branch of the panicle much elongated .... 2. *V. caudatum.*
Terminal branch of the panicle rather short .... 3. *V. californicum.*

1. Veratrum viride Ait. Hort. Kew **3**: 422. 1789. GREEN HELLEBORE.

Veratrum lobelianum eschscholzianum Roem. & Schult. Syst. **7**: 1555. 1830.

Veratrum eschscholtzii Gray, Ann. Lyc. N. Y. **4**: 119. 1837.

TYPE LOCALITY: North America.

RANGE: Alaska to New Brunswick southward to Washington, Minnesota, and Georgia.

SPECIMENS EXAMINED: Clallam County, *Elmer* 2501; Cascade Mountains, latitude 49°, *Lyall* in 1860; Mount Rainier, *Piper*, August, 1895; Skamania County, *Suksdorf* 213; Mount Adams, *Suksdorf* 85; near Skagit Pass, *Lake & Hull* 609; Bridge Creek, *Elmer* 665; Blue Mountains, *Piper*, July, 1896.

ZONAL DISTRIBUTION: Hudsonian.

2. Veratrum caudatum Heller, Bull. Torr. Club **26**: 588. 1899.

TYPE LOCALITY: "In wet meadows at Montesano, Chehalis County, Washington." Collected by Heller.

RANGE: Western Washington.

SPECIMENS EXAMINED: Montesano, *Heller* 4013; Seattle, *Piper* 1101; Chehalis River, *Lamb* 1236.

ZONAL DISTRIBUTION: Humid Transition.

This may be merely a form of *V. californicum* Durand, but the plant is somewhat different in habit.

3. Veratrum californicum Durand, Journ. Acad. Phila. **3**: 103. 1854.

WHITE HELLEBORE. PLATE XX.

Veratrum speciosum Rydberg, Bull. Torr. Club **27**: 531. 1900.

TYPE LOCALITY: California. Collected by Pratt.

RANGE: Washington to California, Colorado, and Montana.

SPECIMENS EXAMINED: Mount Adams, *Suksdorf* 65; Falcon Valley, *Suksdorf* 174; North Fork Atanum, *Henderson*, August 2, 1892; Peshastin, *Sandberg & Leiberg* 518; Wenache, *Whited*; Palouse, *Henderson*, July 15, 1892; Pullman, *Piper*; without locality, *Vasey* 99; Mount Carlton, *Kreager* 263.

ZONAL DISTRIBUTION: Arid Transition.

Veratrum californicum Durand is described as having petioled leaves, but the type specimen clearly shows that the so called petiole is only a part of the sheathing base.

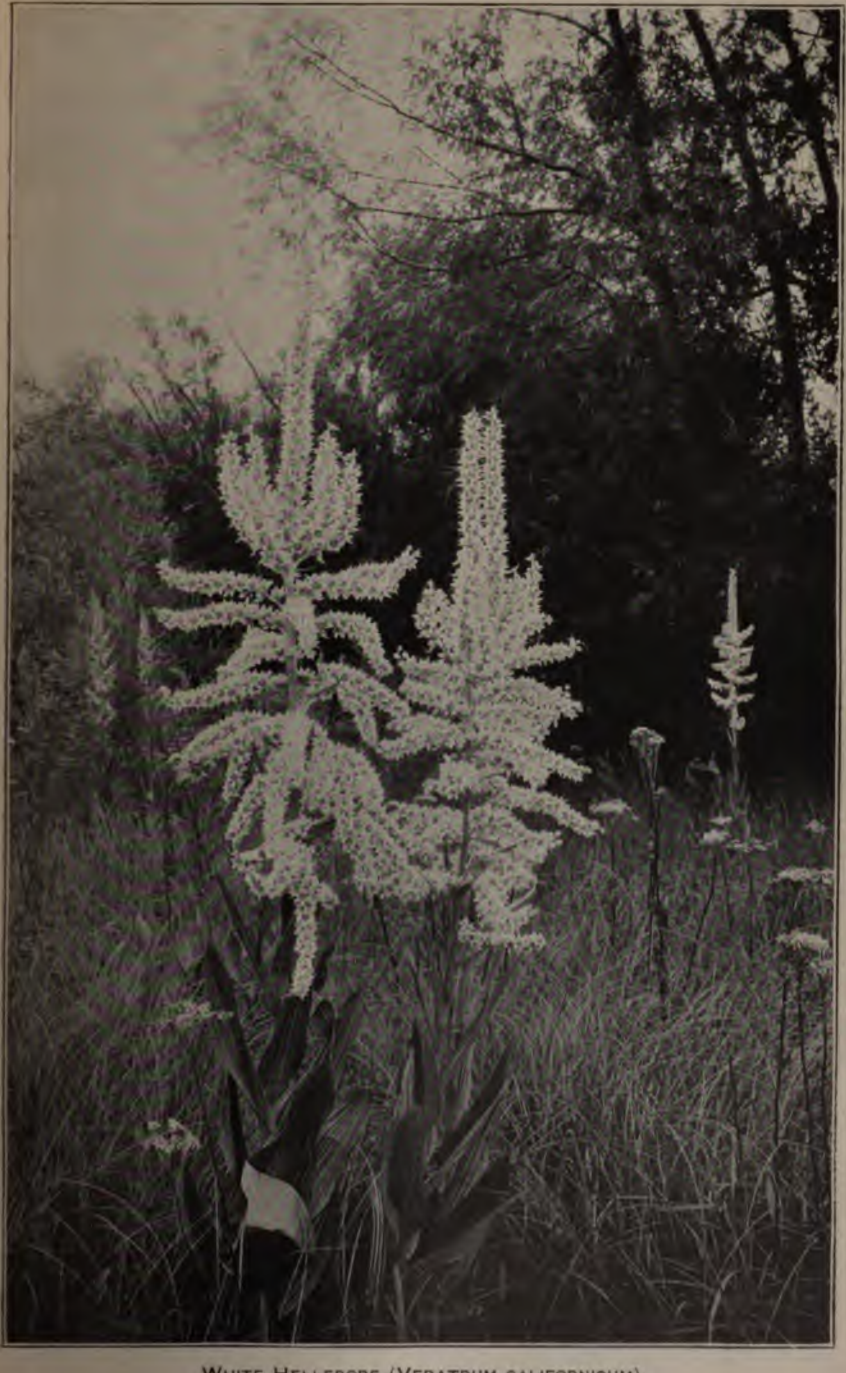
TOFIELDIA.

1. Tofieldia intermedia Rydberg, Bull. Torr. Club **27**: 528. 1900.

TYPE LOCALITY: "Sheh Shooh Lake, Alaska."

RANGE: Alaska to Oregon and Montana.

SPECIMENS EXAMINED: Clallam County, *Elmer* 2501; Olympic Mountains, *Piper* 2242; Cascade Mountains, latitude 49°, *Lyall* in 1859; Mount Rainier, *Piper* 2133; *Flett* 291; Tatoosh Mountains, *Allen* 274; Olympia, *Kincaid*, July 2, 1896; Mount Stuart, *Elmer* 1227; Mount Adams, *Suksdorf*, August 31, 1886; Falcon Valley, *Suksdorf* 516; Lake Wenache, *Sandberg & Leiberg* 629; Horseshoe Basin, *Lake & Hull* 610; Bridge Creek, *Elmer*.



WHITE HELLEBORE (VERATRUM CALIFORNICUM).

A common plant in the moist flats and vales of the Arid Transition area. Photograph by A. B. Leckenby.

Specimens examined: Clallam County, *Elmer* 2498; Port Ludlow, *Binns*, March 30, 1889; Silverton, *Bouck* 178; upper Nisqually Valley, *Allen* 58; *Piper*, August, 1895; Tacoma, *Flett* 75; Easton, *Whited* 295; Fort Vancouver, *Tolmie;* Stevens Pass, *Sandberg & Leiberg* 770; without locality, *Vasey* 85; Pend Oreille River, *Lyall* in 1861; Mount Carlton, *Kreager* 188.

Zonal distribution: Transition and Canadian.

2. **Trillium crassifolium** Piper, Erythea **7**: 104. 1899.

Type locality: "Foothills near Wenatchee," Wash. Collected by Whited.

Range: Known only from the type locality.

Specimens examined: Wenache Mountains, *Whited*, April, 1899; May, 1900.

3. **Trillium chloropetalum** (Torr.) Howell, Fl. N. W. Am. 661. 1902.

Trillium sessile chloropetalum Torr. Pac. R. Rep. **4**: 151. 1856.

Trillium sessile californicum Wats. Proc. Am. Acad. **14**: 273. 1879.

Type locality: "Redwoods," California.

Range: Washington to California in the coast region.

Specimens examined: Roy, *Flett* 2223.

Zonal distribution: Humid Transition.

4. **Trillium petiolatum** Pursh, Fl. **1**: 244. 1814.

Type locality: "On the waters of the Kooskooskee." Collected by Lewis, June 15, 1806. On that day Lewis was on the Lolo River, Idaho.

Range: Idaho and adjacent Washington and Oregon.

Specimens examined: Spokane, *Sandberg & Leiberg*, May, 1893; Spokane County, *Suksdorf* 457; Spokane hills, *Lyall* in 1861; Pullman, *Piper* 1674; *Elmer* 125.

Zonal distribution: Arid Transition.

CLINTONIA.

1. **Clintonia uniflora** (Schult.) Kunth, Enum. Pl. **5**: 159. 1850.

Smilacina borealis uniflora Schult. in Roem. & Schult. Syst. 7^1: 307. 1829.

Smilacina uniflora Menzies; Hook. Fl. Bor. Am. **2**: 175. *t. 190.* 1839.

Type locality: "In ora occidentali Americae borealis." Collected by Menzies.

Range: British Columbia to California and Idaho.

Specimens examined: Clallam County, *Elmer* 2494; Olympic Mountains, *Grant* in 1889; Cascade Mountains, latitude 49°, *Lyall* in 1859; Valley of Nisqually, *Allen* 74; Silverton, *Bouck* 180; Mount Rainier, *Flett* 262; Mount Stuart, *Sandberg & Leiberg* 560; Stampede Pass, *Henderson*, July and October, 1892; Skagit Pass, *Lake & Hull* 612; Peshastin, *Sandberg & Leiberg*, July, 1893; between Spokane and Pend Oreille River, *Lyall* in 1861; Mount Carlton, *Kreager* 184, 229; without locality, *Vasey* 98.

Zonal distribution: Canadian.

VAGNERA.

Flowers numerous, small, in panicles.
  Styles nearly as long as the ovaries .... 3. *V. amplexicaulis.*
  Styles very short.................................. 3a. *V. amplexicaulis brachystyla.*
Flowers larger, few, in racemes.
  Leaves flat and spreading............................ 2. *V. sessilifolia.*
  Leaves folded, ascending............................. 1. *V. stellata.*

1. **Vagnera stellata** (L.) Morong Mem. Torr. Club **5**: 114. 1894.

Convallaria stellata L. Sp. Pl. **1**: 316. 1753.

Smilacina s. Par. **9**: 52. 1807.

Type loca

RANGE: Washington to Labrador, south to California, New Mexico, Iowa, and Pennsylvania.

SPECIMENS EXAMINED: Ellensburg, *Whited* 351; North Yakima, *Leckenby*, May, 1898; Blue Mountains, *Horner* 194.

2. Vagnera sessilifolia (Baker) Greene, Man. Bay Region 316. 1894.

Tovaria sessilifolia Baker, Journ. Linn. Soc. **14**: 566. 1875.

Smilacina sessilifolia Nutt; Wats. Proc. Am. Acad. **14**: 245. 1879.

Smilacina stellata sessilifolia Henderson, Bull. Torr. Club **27**: 358. 1900.

TYPE LOCALITY: "America borealis occidentalis a Columbia brittanica ad Californiam et Mexicum Novum."

RANGE: British Columbia to California and New Mexico.

SPECIMENS EXAMINED: Clallam County, *Elmer* 2495; Cascade Mountains, latitude 49°, *Lyall* in 1858; near Lake Cushman, *Piper*, August, 1895; Silverton, *Bouck* 185; Valley of Nisqually, *Allen* 37; Tacoma, *Flett* 90; west Klickitat County, *Suksdorf* 173; Falcon Valley, *Suksdorf* 172; Skokomish River, *Kincaid*, May, 1892; Wenache Mountains, *Whited* 1052; Sunnyside, *Cotton* 374; Klickitat River, *Flett* 1122; Colville, *Lyall* in 1860; Rock Creek, *Sandberg & Leiberg* 126; Spokane Valley, *Lyall* in 1861; Spokane, *Henderson*, June, 1892; Almota Creek, *Piper*, May, 1897; Pullman, *Elmer* 117; *Piper*, July, 1900; *Hull* 616; Waitsburg, *Horner* 195; without locality, *Vasey*; Clarks Springs, *Kreager* 45; Mount Carlton, *Kreager* 221, 252.

ZONAL DISTRIBUTION: Transition.

3. Vagnera amplexicaulis (Nutt.) Greene, Man. Bay Region 316. 1894.

Smilacina amplexicaulis Nutt. Journ. Acad. Phila. **7**: 58. 1834.

Smilacina racemosa amplexicaulis Wats. Bot. King Explor. 345. 1871.

Vagnera brachypetala Rydberg, Bull. Torr. Club **28**: 268, 1901.

TYPE LOCALITY: "In the valleys of the Rocky Mountains about the sources of the Columbia River." Collected by Wyeth.

RANGE: British Columbia to California and New Mexico.

SPECIMENS EXAMINED: Clallam County, *Elmer* 2500; Baldy Peak, *Lamb* 1345; Coupeville, *Gardner* 290; Tacoma, *Flett* 203; Silverton, *Bouck* 186; Mount Adams, *Suksdorf* 1006; Wenache, *Whited* 1051; Lake Wenache, *Sandberg & Leiberg* 648; Lake Chelan, *Lake & Hull*, August 15, 1892; Pend Oreille River, *Lyall* in 1861; Blue Mountains, *Piper*, July 15, 1896; Mount Carlton, *Kreager* 271.

ZONAL DISTRIBUTION: Transition.

A variable species distinguishable with difficulty from *V. racemosa* (L.) Morong.

3a. Vagnera amplexicaulis brachystyla (Henderson).

Smilacina racemosa brachystyla Henderson, Bull. Torr. Club **27**: 357. 1900.

TYPE LOCALITY: "In the Yakima country," Washington.

RANGE: Eastern Washington and eastern Oregon.

SPECIMENS EXAMINED: Kamiak Butte, *Elmer* 810; *Moore*, June, 1893; *Piper*, July 20, 1899.

UNIFOLIUM.

1. Unifolium bifolium kamtschaticum (Gmel.).

Convallaria bifolia kamtschatica Gmel.; Cham. & Schlecht. Linnaea **6**: 587. 1831.

Maianthemum bifolium dilatatum Wood, Proc. Acad. Phila. **1868**: 174. 1868.

TYPE LOCALITY: Kamtschatka.

RANGE: Alaska to California and Idaho. Siberia.

SPECIMENS EXAMINED: Clallam County, *Elmer* 2494; Silverton, *Bouck*; Seattle, *Piper* 200; Tacoma, *Flett* 197; Nisqually Valley, *Allen* 73; Lower Cascades, *Suksdorf*, May 29, 1886; Fort Vancouver, collector not indicated; without locality, *Vasey* in 1889.

ZONAL DISTRIBUTION: Humid Transition.

This plant was referred to *Smilacina bifolia* L. in Hooker's Flora and to *Smilacina bifolia trifolia* in Cooper's List.

DISPORUM.

Perianth broad at base; stigma 3-cleft.................................... 1. *D. smithii.*
Perianth narrowed at base.
  Fruit ovate, pubescent; stigma entire .... 2. *D. oreganum.*
  Fruit globose, papillose; stigma 3-cleft............................. 3. *D. majus.*

1. **Disporum smithii** (Hook.).

Uvularia smithii Hook. Fl. Bor. Am. **2**: 174. *t. 189.* 1838.

Prosartes menziesii D. Don, Trans. Linn. Soc. **1**: 48. 1839 (December) or 1840.

Disporum menziesii Britt. Bull. Torr. Club, **15**: 188. 1888.

Type locality: "Nutka Sound." Collected by Menzies.

Range: British Columbia to north California, near the coast.

Specimens examined: Hoquiam, *Lamb* 1039a; upper Nisqually Valley, *Allen*, June 25, 1893; Skokomish River, *Kincaid*, May 13, 1892; without locality, *Vasey* 97.

Zonal distribution: Humid Transition.

2. **Disporum oreganum** (S. Wats.) Benth. & Hook.; Howell, Fl. N. W. Am. **1**: 659. 1902.

Prosartes oreganam S. Wats. Proc. Am. Acad. **14**: 271. 1879.

Type locality: Oregon.

Range: British Columbia to Oregon and Idaho.

Specimens examined: Clallam County, *Elmer* 2497; Lake Cushman, *Piper*, August, 1895; Nisqually Valley, *Allen* 148; Cascade Mountains, latitude 49°, *Lyall* in 1861; Tacoma, *Flett*, May, 1896; Falcon Valley, *Suksdorf* 513; along Salmon River, *Horner* 472; Stampede Pass, *Henderson*, June, 1892; Wenache Mountains, *Brandegee* 1110; Fort Vancouver, *Tolmie;* Lake Wenache, *Sandberg & Leiberg* 644; Blue Mountains, *Piper*, July, 1896; foothills of Blue Mountains, *Horner* 189; without locality, *Vasey;* Frontier, *Kreager* 468.

Zonal distribution: Transition.

3. **Disporum majus** (Hook.) Britton, Bull. Torr. Club **15**: 188. 1888.

Prosartes lanuginosa major Hook. Fl. Bor. Am. **2**: 174. 1839.

Prosartes trachycarpa S. Wats. Bot. King. Explor. 344. 1871.

Type locality: "Between Norway House and Cumberland House Fort." Collected by Richardson.

Range: British Columbia and Saskatchewan to Arizona.

Specimens examined: Silverton, *Bouck* 181; along Twisp River, *Whited*, July, 1896; Falcon Valley, *Suksdorf* 901; Conconully, *Whited* 1321; Wenache, *Whited* 69; Clealum, *Whited* 422?; Spokane, *Piper* 2285, 2268; along Salmon River, *Horner* 473; Blue Mountains, *Piper*, July, 1896; Mount Carlton, *Kreager* 310; Clarks Springs, *Kreager* 130.

Zonal distribution: Arid Transition.

Prosartes lanuginosa major Hook. has been associated with *P. oreganum* Wats., but mistakenly, since the latter species does not range east of Idaho. A Richardson specimen in the Gray Herbarium perhaps of the type collection is unquestionably *P. trachycarpum* Wats. We have, therefore, no hesitancy in giving the synonymy as above.

STREPTOPUS.

Leaves glaucous beneath, half-clasping; flowers greenish .... 1. *S. amplexifolius.*
Leaves green on both sides, sessile; flowers, rose-colored............ 2. *S. roseus.*

1. **Streptopus amplexifolius** (L.) DC. Fl. Fr. **3**: 174. 1805.

Uvularia amplexifolia L. Sp. Pl. **1**: 304. 1753.

Type locality: "Habitat in Bohemiae, Silesiae, Saxoniae, Delphinatus montibus."

Range: Alaska to Labrador and southward to Arizona and Pennsylvania. Europe. Asia.

Specimens examined: Cascade Mountains, latitude 49°, *Lyall* in 1859; Coupeville, *Gardner*, May 25, 1897; Silverton, *Bouck* 182; Seattle, *Piper* in 1885; Tacoma, *Flett*, 204; Stevens

Pass, *Sandberg & Leiberg* 737; near Skagit Pass, ***Lake & Hull*** **615; Lake Wenache,** ***Sandberg & Leiberg*** 646; Blue Mountains, *Piper*, July, 1896; without locality, ***Vasey*** **104;** Mount Carlton, *Kreager* 254, 191.

Zonal distribution: Transition.

2. **Streptopus roseus** Michx. Fl. **1**: 201. 1803.

Streptopus curvipes Vail, Bull. Torr. Club. **28**: 267. 1901.

Type locality: "Hab. in excelsis montibus Carolinae septentrionalis et in Canada."

Range: Alaska to Oregon, Labrador, and Georgia.

Specimens examined: Cascade Mountains, latitude 49°, *Lyall* in 1859; Lake Cushman, *Piper* in 1890; Goat Mountains, *Allen*, August 12, 1895; Silverton, ***Bouck*** **183**; Skamania County, *Suksdorf*, August 10, 1886; Mount Adams, *Suksdorf* 44; Stampede Pass, ***Henderson***, April 10, 1892; Stevens Pass, *Whited* 1460; Simcoe Mountains, *Howell* in 1879; Nason City, *Sandberg & Leiberg* 652.

Zonal distribution: Humid Transition.

The western form of this species is commonly smaller than that of the eastern States, and shows a tendency to produce longer rhizomes, but we believe these differences are not specific, especially as rhizomatous forms occur also in the Allegheny Mountains.

KRUHSEA.

1. **Kruhsea streptopoides** (Ledeb.) Kearney in Herron, Explor. in Alaska, Adj. Gen. Off. **31**: 74. 1901.

Smilacina streptopoides Ledeb. Fl. Ross. **4**: 128. 1853.

Kruhsea tilingiana Regel, Nouv. Mem. Soc. Nat. Mosc. **11**: 122. 1859.

Streptopus brevipes Baker, Journ. Linn. Soc. **14**: 592. 1875.

Type locality: "Hab. in Siberia orientali pr. Ajan! inque insula Sitka."

Range: Alaska to Washington. Siberia.

Specimens examined: Cacsade Mountains, latitude 49°, *Lyall* in 1859.

Zonal distribution: Canadian.

ASPARAGUS.

1. **Asparagus officinalis** L. Sp. Pl. **1**: 313. 1753. Asparagus.

The cultivated asparagus quickly escapes from cultivation and becomes more or less established. This is especially true in somewhat alkaline lands in the Yakima Valley.

IRIDACEAE. Iris Family.

Flowers very large; styles petal-like .... Iris (p. 202).
Flowers moderate; styles filiform.
  Filaments united to the top; flowers usually blue .... Sisyrinchium (p. 203).
  Filaments united only at base; flowers never blue.
    Flowers yellow; styles cleft to the middle .... Hydastylus (p. 204).
    Flowers red; styles cleft near the top .... Olsynium (p. 204).

IRIS.

Stems leafy; bracts green, not scarious .... 2. *I. tenax.*
Stems leafless; bracts largely scarious .... 1. *I. missouriensis.*

1. **Iris missouriensis** Nutt. Journ. Acad. Phila. **7**: 58. 1834. Plate XXI.

Iris tolmieana Herbert, Bot. Beech. Voy. 396. 1839.

Iris cavurina Herbert; Hook. Fl. Bor. Am. **2**: 206. 1839 (November).

Type locality: "Towards the sources of the Missouri." Collected by Wyeth.

Range: British Columbia to Dakota, Arizona, and California.

Specimens examined: Whidby Island, *Gardner* 278, 426; Ellensburg, ***Whited***, May, 1897; Yakima, *Leckenby*, May, 1898; North Yakima, ***Henderson***, May, 1892; Prosser

Henderson, May, 1892; Rock Creek, *Sandberg & Leiberg* 100; Pullman, *Piper*, June, 1893; *Elmer* 824; *Piper* 1683; Wenas, *Griffiths & Cotton* 67.

ZONAL DISTRIBUTION: Arid Transition.

Some Washington specimens have been referred to *Iris longipetala* Herbert, but all such seem to us forms of *I. missouriensis*. The occurrence of this species on Whidby Island is surprising. No other station for the plant is known west of the Cascade Mountains.

2. Iris tenax Dougl.; Lindl. Bot. Reg. **15**: *t. 1218*. 1829.

TYPE LOCALITY: "A common plant in north California and along the coast of New Georgia, in dry soils or open parts of woods, flowering in April and May." Collected by Douglas.

RANGE: Washington to California in the coast region.

SPECIMENS EXAMINED: Montesano, *Heller* 3876; *Henderson;* Fort Vancouver, *Tolmie;* Manor, *Piper*, July 14, 1899; Vancouver, *Piper* 4943.

ZONAL DISTRIBUTION: Humid Transition.

SISYRINCHIUM. BLUE-EYED GRASS.

Bracts of the spathe linear, equally narrow, the inner exceeding the flowers, the outer much longer.................................. 1. *S. sarmentosum.*
Bracts of the spathe dissimilar, the inner broader than the outer and always shorter than the flowers.
  Perianth-segments 4 to 7 mm. long, white or pale; leaves and stems 0.5 to 1 mm. wide.................................. 2. *S. septentrionale.*
  Perianth-segments 12 to 18 mm. long, blue.
    Stems usually 2-branched.................................. 3. *S. birameum.*
    Stems always simple.
      Leaves 1 to 3.5 mm. broad, firm; stems 1 to 3 mm. wide. 4. *S. idahoense.*
      Leaves 0.5 to 1.5 mm. broad, soft; stems 1 to 1.5 mm wide.................................. 5. *S. segetum.*

1. Sisyrinchium sarmentosum Suksdorf, Erythea **3**: 121. 1895.

TYPE LOCALITY: Skamania County, Washington. Collected by Suksdorf.

RANGE: Known only from the type locality.

SPECIMENS EXAMINED: Skamania County, *Suksdorf* 2233.

2. Sisyrinchium septentrionale Bicknell, Bull. Torr. Club **26**: 452. 1899.

TYPE LOCALITY: Moose Mountain Creek, Assiniboia.

RANGE: Assiniboia to Washington and Idaho.

SPECIMENS EXAMINED: "Spokane to Colville," *Wilkes Expedition* in 1838–1842.

3. Sisyrinchium birameum sp. nov.

Loosely tufted, 40 to 50 cm. high, the herbage discolored in drying; stems smooth, erect, winged, the principal ones branched above, 1 to 2 mm. broad; leaves firm, erect, rather few, about half the height of the stem, 2 to 3 mm. broad, acute; cauline leaf when present 8 to 10 mm. long, the two peduncles usually exceeding it; bracts of the spathe subequal, lanceolate, purplish, the inner 2 to 2.5 cm. long, always shorter than the pedicels, the outer often of the same length, sometimes a half longer, both hyaline-margined and attenuate-acute; flowers 2 to 5 on slender, erect pedicels; perianth dark blue with a yellow eye, its segments 12 to 15 mm. long; stamineal column 5 to 6 mm. long; ovaries glandular-puberulent; capsules globose, 4 to 5 mm. broad; seeds black, foveolate, 1 mm. long, the angles irregularly winged.

Collected in swamps near Vancouver, June 5, 1905, no. 4926, the type in the National Herbarium. The species is closely allied to *S. idahoense* Bicknell, but its frequently branched stems scarcely permit its association therewith. Typical *S. idahoense* occurred, however, in drier ground near by and it is possible that our plant is merely a luxuriant branched form of that species.

ORCHIDACEAE. Orchid Family.

Perfect anthers 2; lip large, sac-like........................ Cypripedium (p. 205).
Perfect anther 1.
Plants saprophytic, without green herbage.
Flowers spurred, reddish or white.................. Corallorhiza (p. 206).
Flowers spurless, white.......................... Cephalanthera (p. 206).
Plants with ordinary green herbage.
Flower and leaf solitary; plant bulbous............. Cytherea (p. 207).
Flowers several to many in racemes.
Leaves only two.
Both leaves cauline; lip 2-lobed........... Ophrys (p. 207).
Both leaves basal; lip entire.............. Leptorchis (p. 208).
Leaves more than two.
Cauline leaves reduced to bracts.
Basal leaves several, white-reticulated.. Peramium (p. 208).
Basal leaves two, green and shining.... Lysias (p. 208).
Cauline leaves not reduced to bracts.
Anther on the face of the column.
Stem leaves abruptly reduced; lateral sepals adnate to the base of the lip....................... Piperia (p. 208).
Stem leaves gradually reduced; lateral sepals free................ Limnorchis (p. 209).
Flowers spirally arranged in a dense spike....................... Ibidium (p. 211).
Anthers on the summit of the column.
Flowers in a loose leafy raceme..... Epipactis (p. 211).

CYPRIPEDIUM. Lady's slipper.

Lip about 1 cm. long; flowers greenish brown........................ 1 *C. fasciculatum.*
Lip 1.5 to 5 cm. long; flowers not greenish brown.
Flowers yellow; lip 1.5 to 3 cm. long.......................... 2. *C. parviflorum.*
Flowers brown, with a white lip 3 to 5 cm. long................. 3. *C. montanum.*

1. **Cypripedium fasciculatum** Kellogg; S. Wats. Proc. Am. Acad. **17**: 380. 1882.

Type locality: "On the White Salmon River above the falls," Washington. Collected by Suksdorf.

Range: Washington to California.

Specimens examined: Klickitat County, *Suksdorf* 900, 310, May, June, 1886; Wenache Region, *Brandegee* 1095.

2. **Cypripedium parviflorum** Salisb. Trans. Linn. Soc. **1**: 77. 1791.

Type locality: "Sponte nascentem in Virginia."

Range: British Columbia to Newfoundland south to Washington, Missouri, and Georgia.

Specimens examined: Spokane County, *Sandberg & Leiberg* 125; *Suksdorf* 946; Spokane, *Piper*, May, 1897; *Henderson* 2478.

Our western form corresponds to *C. flavescens* DC. in Redouté, Lil. **1**: *pl. 20.* 1802, questionably distinguishable by somewhat narrower leaves and with the lip a little compressed laterally.

3. **Cypripedium montanum** Dougl.; Lindl. Gen. & Sp. Orch. 528. 1840.

Type locality: "Hab. in America boreali-occidentali." Collected by Douglas.

Range: Washington and Idaho to California.

Specimens examined: Mount Stuart, *Sandberg & Leiberg* 572; Wenache Mountains, *Whited* 152; Clealum, *Henderson*, June, 1892; Kalispel Valley, *Kreager* in 1902; Mount

Carlton, *Kreager* 285; Spokane, *Henderson*, June, 1892; Blue Mountains, *Lake & Hull* 623; Pullman, *Carl Cozier*, June, 1901; without locality, *Vasey* in 1889.

ZONAL DISTRIBUTION: Transition.

CORALLORHIZA. CORAL ROOT.

- Spur none; petals and sepals purple, veiny .... 1. *C. striata.*
- Spur present.
  - Petals and sepals pale, 1-nerved; spur very short .... 2. *C. corallorhiza.*
  - Petals and sepals 3-nerved; spur prominent.
    - Spur wholly attached to the ovary .... 3. *C. multiflora.*
    - Spur free for its apical half .... 4. *C. mertensiana.*

1. **Corallorhiza striata** Lindl. Gen. & Sp. Orch. 534. 1840.

TYPE LOCALITY: "Hab. in America boreali-occidentali." Collected by Douglas.

RANGE: British Columbia to New York, south to California.

SPECIMENS EXAMINED: Whidby Island, *Gardner* 276; Admiralty Head, *Piper*, April, 1898; Tacoma, *Flett* 53; Roy, *Allen*, May 19, 1889; near Fort Vancouver, *Douglas*; Klickitat County, *Suksdorf* 59; Blue Mountains, *Lake & Hull* 785.

ZONAL DISTRIBUTION: Humid Transition.

2. **Corallorhiza corallorhiza** (L.) Karst. Deutsch. Fl. 448. 1880–83.

Ophrys corallorhiza L. Sp. Pl. 2: 945. 1753.

Corallorhiza innata R. Br. in Ait. Hort. Kew. ed. 2. 5: 209. 1813.

TYPE LOCALITY: Europe.

RANGE: Alaska to Labrador, south to Washington, Nebraska, and Georgia.

SPECIMENS EXAMINED: Skamania County, *Suksdorf* 579; Larm River, *Suksdorf* 171; Blue Mountains, *Horner* 469; *Piper*.

ZONAL DISTRIBUTION: Canadian.

3. **Corallorhiza multiflora occidentalis** Lindl. Gen. & Sp. Orch. 534. 1840.

TYPE LOCALITY: California.

RANGE: British Columbia to California.

SPECIMENS EXAMINED: Clallam County, *Elmer* 2553; Chehalis County, *Lamb* 1163; upper Valley Nisqually, *Allen* 33; Mount Ranier, *Flett* 280; Admiralty Head, *Piper*, May, 1898; Olympia, *Henderson* in 1892; Roy, *Allen*, June, 1889; Blue Mountains, *Piper*, July, 1896; *Horner* 468; without locality, *Vasey* in 1889; Big Meadow, *Kreager* 414, 420.

ZONAL DISTRIBUTION: Transition and Canadian.

4. **Corallorhiza mertensiana** Bong. Mem. Acad. St. Petersb. VI. 2: 165. 1832.

TYPE LOCALITY: Sitka.

RANGE: Alaska to California.

SPECIMENS EXAMINED: Clallam County, *Elmer* 2554; Baldy Peak, *Lamb* 1292; Mount Constitution, *Henderson*, July, 1892; Nisqually Valley, *Allen* 234; Skamania County, *Suksdorf*, July 25, 1886; Fort Vancouver, *Tolmie*; without locality, *Vasey* in 1889.

ZONAL DISTRIBUTION: Canadian.

CEPHALANTHERA.

1. **Cephalanthera austinae** (A. Gray) Heller, Cat. N. A. Pl. ed. 2. 4. 1900.

Chloraea austinae A. Gray, Proc. Am. Acad. 12: 83. 1876.

Cephalanthera oregana Reichenb. Linnaea 41: 53. 1877.

TYPE LOCALITY: "Banks of a wooded ravine in the Sierra Nevada, California, near Quincy in Plumas Co." Collected by Mrs. R. M. Austin.

RANGE: Washington and Idaho to California.

Specimens examined: Upper Nisqually Valley, *Allen* 149; Elbe, *Flett* 289; Falcon Valley, *Suksdorf* 500; Wind River, *Flett* 1109; Blue Mountains, *Piper* 2428; Green River Hot Springs, *Piper* in 1887.

Zonal distribution: Canadian.

CYTHEREA.

1. **Cytherea bulbosa** (L.) House, Bull. Torr. Club **32**: 382. 1905. Calypso.
Cypripedium bulbosum L. Sp. Pl. **2**: 951. 1753.
Calypso borealis Salisb. Parad. Lond. *t. 89*. 1806.
Cytherea borealis Salisb. Trans. Hort. Soc. Lond. **1**: 301. 1812.
Calypso bulbosa Oakes, Cat. Vermont Pl. 28. 1842.
Calypso bulbosa "forma occidentalis" Holzinger, Contr. Nat. Herb. **3**: 251. 1895.
Calypso occidentalis Heller, Bull. Torr. Club **25**: 193. 1898.

Type locality: "Habitat in Lapponia, Russia, Sibiria."

Range: Alaska to Labrador, south to California, Michigan, and Maine.

Specimens examined: Whidby Island, *Piper*, May, 1898; Seattle, *Piper* 193; Tacoma, *Flett* 111; Olympia, *Cooper;* Roy, *Allen*, April 19, 1889; Blue Mountains, *Horner* 467.

Zonal distribution: Transition and Canadian.

The western form of this species has the hairs on the lip white instead of yellow. It grows commonly in places carpeted by Hypnum, but we have never found it occurring in Sphagnum, as it does in the New England States.

OPHRYS.

Column very short, 5 mm. long.................................... 1. *O. cordata.*
Column 2 to 3 mm. long.
  Lip 5 mm. long; ovary glabrous............................... 2. *O. caurina.*
  Lip 9 mm. long; ovary glandular.............................. 3. *O. convallarioides.*

1. **Ophrys cordata** L. Sp. Pl. **2**: 946. 1753.
Listera cordata R. Br. in Ait. Hort. Kew. ed. 2. **5**: 201. 1813.
Listera nephrophylla Rydberg, Mem. N. Y. Bot. Gard. **1**: 108. 1900.

Type locality: "Habitat in Europae frigidae sylvis humentibus."

Range: Alaska to Labrador, south to Oregon and Pennsylvania. Europe. Asia.

Specimens examined: Westport, *Lamb* 1093; Cascade Mountains, latitude 49°, *Lyall* in 1859; Skokomish Valley, *Kincaid*, May, 1892; Stevens Pass, *Sandberg & Leiberg* 780; Ilwaco, *Piper* 4951; Seattle, *Piper* in 1885.

Zonal distribution: Humid Transition.

2. **Ophrys caurina** (Piper) Rydberg, Bull. Torr. Club **32**: 610. 1905.
Listera caurina Piper, Erythea **6**: 32. 1898.
Listera retusa Suksdorf, Deutsch. Bot. Monatss. **18**: 155. 1900.

Type locality: Cascade Mountains, Washington. Type collected by Henderson.

Range: British Columbia to Oregon.

Specimens examined: Clallam County, *Elmer* 2548; Baldy Peak, *Lamb* 1295; Mount Baker, *Flett* 865; Skamania County, *Suksdorf* 2326; Green River Hot Springs, *Piper* 380; Stampede Pass, *Henderson*, July, 1892.

Zonal distribution: Canadian.

3. **Ophrys convallarioides** (Sw.) W. F. Wight, Bull. Torr. Club **32**: 380. 1905.
Epipactis convallarioides Sw. Kongl. Vet. Akad. Handl. Stockh. II. **21**: 232. 1800.
Listera convallarioides Torr. Comp. 320. 1826.

Type locality: "E. Terra Nova Amer. sept."

Range: Alaska to Nova Scotia, south to California and Vermont.

SPECIMENS EXAMINED: Big Creek Prairie, *Lamb* 1402: near Mount Rainier, *Smith*, August, 1890; Lake Wenache, *Sandberg & Leiberg* 641; Blue Mountains, *Piper* 2426; Davis ranch, *Kreager* 301.

ZONAL DISTRIBUTION: Canadian.

LEPTORCHIS.

1. **Leptorchis loeselii** (L.) MacM. Met. Minn. 173. 1893.

Ophrys loeselii L. Sp. Pl. **2**: 947. 1753.

Liparis loeselii Richard. Mem. Mus. Par. **4**: 60. 1818.

TYPE LOCALITY: "Habitat in Sueciae, Borussiae paludibus."

RANGE: Washington to Nova Scotia, south to Missouri and Pennsylvania.

SPECIMENS EXAMINED: Falcon Valley, *Suksdorf*, June 25, August, 1881.

PERAMIUM.

1. **Peramium decipiens** (Hook.). RATTLESNAKE PLANTAIN.

Spiranthes decipiens Hook. Fl. Bor. Am. **2**: 203. 1839.

Goodyera menziesii Lindl. Gen. & Sp. Orch. 492. 1840.

Peramium menziesii Morong, Mem. Torr. Club **5**: 124. 1894.

TYPE LOCALITY: Lake Huron.

RANGE: British Columbia to Quebec, south to California and New York.

SPECIMENS EXAMINED: Clallam County, *Elmer* 2547; Seattle, *Piper* in 1885; Cascade Mountains, latitude 49°, *Lyall* in 1859 60; Railroad Creek, *Elmer* 860; Nisqually Valley, *Allen* 32; Skagit Pass, *Lake & Hull* 786; without locality, *Vasey* in 1889; Davis ranch, *Kreager* 209; Lake Kalispel, *Kreager* 340.

ZONAL DISTRIBUTION: Transition.

LYSIAS.

1. **Lysias orbiculata** (Pursh) Rydberg in Britton, Man. 294. 1901.

Orchis orbiculata Pursh, Fl. **2**: 588. 1814.

Habenaria orbiculata Hook. Exot. Fl. **2**: *t. 145*. 1825.

Platanthera menziesii Lindl. Gen. & Sp. Orch. 286. 1835.

TYPE LOCALITY: "On the mountains of Pennsylvania and Virginia."

RANGE: British Columbia to Newfoundland, south to Washington and North Carolina.

SPECIMENS EXAMINED: Mount Baker, *Flett* 867; Monte Cristo Lake, ***Misses Coffin & Goodspeed***, August, 1895; Cascade Mountains, latitude 49°, *Lyall* in 1859; Green River Hot Springs, *Piper* in 1887; without locality, *Vasey* in 1889; Kalispel Lake, *Kreager* 342.

ZONAL DISTRIBUTION: Canadian.

PIPERIA.

Spur short, slightly exceeding the lip .... 1. ***P. unalaschensis.***

Spur slender, 2 to 3 times as long as the lip.

  Lip linear to lanceolate.

    Spike loose; lip 4 to 5 mm. long; spur 8 to 10 mm. long.... 2. ***P. leptopetala.***

    Spike dense; lip 6 mm. long; spur 15 to 18 mm. lon....... 3. ***P. multiflora.***

  Lip ovate to ovate-lanceolate.

    Spike usually loose; stems 40 to 70 cm. high................ 4. ***P. elegans.***

    Spike very dense; stems stout, 20 to 30 cm. high.......... 5. ***P. michaeli.***

1. **Piperia unalaschensis** (Spreng.) Rydberg, Bull. Torr. Club **28**: 270. 1901.

Spiranthes unalaschensis Spreng. Syst. **3**: 708. 1826.

Habenaria schischmareffiana Cham. Linnaea **3**: 29. 1828.

Habenaria foetida Wats. Bot. King Explor. 341. 1871.

TYPE LOCALITY: "Ins. Aleut."

Range: Alaska to California, eastward to Alberta and Colorado.

Specimens examined: Clallam County, *Elmer* 2552; Cascade Mountains, latitude 49°, *Lyall* in 1859; Seattle, *Piper* in 1885; Olympia, *Kincaid*, July, 1896; McAllisters Lake, *Henderson*, June, 1892; Brooklyn, *Savage* 19; Twisp River, *Whited*, July, 1896; Nason Creek, *Sandberg & Leiberg* 617; Mount Stuart, *Sandberg & Leiberg* 568; Mount Rainier, *Allen;* Klickitat River, *Henderson*, August, 1892; Wind River, *Flett* 1111; Blue Mountains, *Piper*, July, 1896; without locality, *Vasey* in 1889.

Zonal distribution: Transition and Canadian.

2. **Piperia leptopetala** Rydberg, Bull. Torr. Club **28**: 637. 1901.

Type locality: "Mountains east of San Diego," California. Collected by Parry.

Range: Washington to California.

Specimens examined: Nisqually River, *Wilkes Expedition* 146; Point Orchard, *Piper* 1081 in part.

This supposed species may prove to be only a form of *P. elegans*.

3. **Piperia multiflora** Rydberg, Bull. Torr. Club **28**: 638. 1901.

Type locality: Grays Harbor, Washington. Collected by the Wilkes Expedition.

Range: Washington to California and Montana.

Specimens examined: Grays Harbor, *Wilkes Expedition* in 1838–1842; Cascade Mountains, *Brandegee* 475.

Like the preceding, this may have to be reduced to *P. elegans*. Good suites of specimens in this group are needed to clear up the species.

4. **Piperia elegans** (Lindl.) Rydberg, Bull. Torr. Club **28**: 270. 1901.

Platanthera elegans Lindl. Gen. & Sp. Orch. 285. 1835.

Habenaria elegans Boland. Cat. Pl. San Franc. 29. 1870.

Piperia elongata Rydberg, Bull. Torr. Club **28**: 270. 1901.

Type locality: "Hab. in America boreali-occidentali." Collected by Douglas.

Range: British Columbia to Idaho and California.

Specimens examined: Coupeville, *Gardner* 275, 271; Orchard Point, *Piper*, July, 1895; Seattle, *Piper*, August, 1891; Tacoma, *Flett*, June 20, 1896; Mount Adams, *Henderson* 68; Rock Island, *Henderson*, July 3, 1892; Haven's ranch, *Henderson*, August 2, 1892; Simcoe Mountains, *Howell* 352; Lake Wenache, *Sandberg & Leiberg* 647a; Blue Mountains, *Piper* August 2, 1896; Johns Island, *Lawrence* 199.

Zonal distribution: Transition.

5. **Piperia michaeli** (Greene) Rydberg, Bull. Torr. Club **28**: 640. 1901.

Habenaria michaeli Greene, Man. Bay Reg. 306. 1894.

Type locality: "Open hills, under oaks, etc., from near Livermore southward," California.

Range: Washington to California.

Specimens examined: Grays Harbor, *Wilkes Expedition* 1554 in part; Nisqually River, *Wilkes Expedition* 146 in part.

LIMNORCHIS.

Flowers green or sometimes purple-tinged.
  Spur clavate, much shorter than the lanceolate lip; spike long and dense.......... 1. *L. stricta.*
  Spur not clavate, about as long as the lanceolate lip; spike short and dense.......... 2. *L. viridiflora.*
Flowers white or whitish.
  Lip linear; spike loose, few-flowered.......... 3. *L. laxiflora.*
  Lip lanceolate, broadest at base.

Spur clavate, usually shorter than the lip............ 4. *L. dilatata.*
Spur not clavate, longer than the lip.
  Spike moderately dense; spur acutish........... 5. *L. leucostachys.*
  Spike very dense; spur obtuse................. 5a. *L. leucostachys robusta.*

1. **Limnorchis stricta** (Lindl.) Rydberg, Mem. N. Y. Bot. Gard. 1: 105. 1900.
Platanthera stricta Lindl. Gen. & Sp. Orch. 288. 1835.
Habenaria gracilis Wats. Proc. Am. Acad. 12: 277. 1877.

Type locality: "In America boreali-occidentali." Collected by Douglas.

Range: Alaska to Washington and Colorado.

Specimens examined: Clallam County, *Elmer* 2549; Mount Rainier, *Smith* 874; *Piper* 2094; Cascade Mountains, latitude 49°, *Lyall* in 1859; Silverton, *Bouck;* Seattle, *Piper*, June, 1889; Olympia, *Henderson*, May, 1892; upper Nisqually Valley, *Allen* 76; Mount Adams, *Suksdorf* 41; Wind River, *Flett* 110; Skagit Pass, *Lake & Hull* 624 in part; Ellensburg, *Whited* 532; Stampede Pass, *Henderson*, October, 1892; Simcoe Mountains, *Howell* 302; Lake Wenache, *Sandberg & Leiberg* 647; Ilwaco, *Piper* 5001; *Kreager* 189; Green River Hot Springs, *Piper* 415.

Zonal distribution: Transition to Hudsonian.

2. **Limnorchis viridiflora** (Cham.) Rydberg, Bull. Torr. Club 28: 616. 1901.
Habenaria borealis viridiflora Cham. Linnaea 3: 28. 1828.

Type locality: "In Unalaschka."

Range: Alaska to Washington and Colorado.

Specimens examined: Spokane County, *Suksdorf* 452.

Perhaps not distinct from *L. hyperborea* (*L.*) Rydb. (*Habenaria hyperborea* R. Br.), to which it has been referred.

3. **Limnorchis laxiflora** Rydberg, Bull. Torr. Club 28: 630. 1901.

Type locality: Coast Mountains, Oregon.

Range: Washington and Oregon to Colorado.

Specimens examined: Eastern Washington, without locality, *Wilkes Expedition.*

4. **Limnorchis dilatata** (Pursh) Rydberg in Britton, Man. 294. 1901.
Orchis dilatata Pursh, Fl. 2: 588. 1814.
Habenaria dilatata Hook. Exot. Fl. 2: *t. 95.* 1825.
Habenaria borealis Cham. Linnaea 3: 28. 1828.

Type locality: Labrador.

Range: Alaska to New England, Colorado, and Washington.

Specimens examined: Olympic Mountains, *Piper*, August, 1895; Stevens Pass, *Whited* 1840; Mount Stuart, *Elmer* 1213; Mount Adams, *Suksdorf* 2298.

5. **Limnorchis leucostachys** (Lindl.) Rydberg, Mem. N. Y. Bot. Gard. 1: 106. 1900.
Platanthera leucostachys Lindl. Gen. & Sp. Orch. 288. 1835.
Habenaria leucostachys Wats. Bot. Cal. 2: 134. 1880.

Type locality: "In ora occidentali Americae septentrionalis." Collected by Douglas.

Range: Alaska to California and Utah.

Specimens examined: Clallam County, *Elmer* 2551; Blue Mountains, *Lake & Hull*, July, 1892; Waitsburg, *Horner* 188; Salmon River, Blue Mountains, *Horner* 462.

Zonal distribution: Transition.

5a. **Limnorchis leucostachys robusta** Rydberg, Bull. Torr. Club 28: 626. 1901.

Type locality: "Washington." Collected by G. R. Vasey in 1889.

Range: British Columbia to Oregon and Idaho.

Specimens examined: Seattle, *Piper* 291, July, 1897; Olympia, *Heller* 4046; *Kincaid*, July, 1896; Nisqually Valley, *Allen* 75; Skagit Pass, *Lake & Hull* 624 in part; Wenache region, *Tweedy*, July, 1883; Mount Stuart, *Sandberg & Leiberg* 576; Ellensburg, *Whited* 532, 698; Falcon Valley, *Suksdorf* 1356; Marshall Junction, *Piper*, July 2, 1896; Mount Carlton, *Kreager* 195; without locality, *Vasey* in 1889.

Zonal distribution: Transition and Canadian.

IBIDIUM.

Lip much dilated at the apex, the basal swellings small............ 1. *I. romanzoffianum.*
Lip little dilated at the apex, the basal swellings large............. 2. *I. porrifolium.*

1. **Ibidium romanzoffianum** (Cham.) House, Muhlenbergia **1**: 129. 1906.
Spiranthes romanzoffiana Cham. Linnaea **3**: 32. 1828.
Gyrostachys romanzoffiana MacM. Met. Minn. 171. 1892.
Gyrostachys stricta Rydberg, Mem. N. Y. Bot. Gard. **1**: 107. 1900.
Type locality: "Unalaschka."
Range: Alaska to Newfoundland, south to California, Colorado, and New York.
Specimens examined: Whidby Island, *Gardner* 272; Cascade Mountains 49°, *Lyall* in 1859; Mount Adams, *Henderson*, August, 1892; Haven's ranch, *Henderson*, August, 1892; Tacoma, *Flett* 125; Fort Vancouver, *Tolmie;* Stevens Pass, *Whited* 1439; without locality, *Vasey* in 1889; Blue Mountains, *Horner* 471; Kalispel Lake, *Kreager* 337; without locality, *Cooper*; Seattle, *Piper* in 1885; Mount Rainier, *Piper*, August, 1888.
Zonal distribution: Transition.

This species was referred to *Spiranthes cernua* in Hooker's Flora and in Cooper's Report. Subalpine forms of it from sphagnums bogs are much smaller and with short spikes.

2. **Ibidium porrifolium** (Lindl.) Rydberg, Bull. Torr. Club **32**: 610. 1905.
Spiranthes porrifolia Lindl. Gen. & Sp. Orch. 467. 1840.
Gyrostachys porrifolia Kuntze, Rev. Gen. Pl. **2**: 664. 1891.
Type locality: "In Louisiana."
Range: Washington to California.
Specimens examined: Falcon Valley, *Suksdorf*, September 3, 1881.

EPIPACTIS.

1. **Epipactis gigantea** Dougl.; Hook. Fl. Bor. Am. **2**: 202. *t. 202.* 1839.
Type locality: "N. W. America. On the subalpine regions of the Blue and Rocky Mountains. *Douglas.* Columbia River, about Fort Vancouver. *Dr. Scouler.*"
Range: Washington to California and Texas.
Specimens examined: Clallam County, *Elmer* 2550; Rock Island, *Sandberg & Leiberg* 453; near Priest Rapids, *Brandegee* 1091; Spokane County, *Suksdorf* 240; Seattle, *Tarleton*; Lake Crescent, *Lawrence* 301.
Zonal distribution: Upper Sonoran and Transition.

SALICACEAE. WILLOW FAMILY.

Stamens 1 to 5 in ours; bracts entire................................ SALIX (p. 211)
Stamens numerous; bracts fimbriate................................ POPULUS (p. 217).

SALIX. WILLOW.

- Trees with furrowed bark; stamens 5 or more, aments on short leafy branchlets.
  - Petioles slender, glandless; leaves broadly lanceolate .... 1. *S. amygdaloides.*
  - Petioles short, bearing glands; leaves narrowly lanceolate.
    - Leaves pale beneath, attenuate from the middle........... 2. *S. lasiandra.*
    - Leaves green beneath, long, attenuate nearly from the base . 2a. *S. caudata.*
- Shrubs, rarely trees, with smooth or at least not furrowed bark; stamens 2 or 1.
  - Stamen 1; aments appearing before the leaves; leaves very silky beneath, entire.. 21. *S. sitchensis.*
  - Stamens 2.
    - Scales of the aments pale; leaves narrow, appearing before the aments.

Stigmas long and slender.
Leaves canescent, becoming glabrate .... 3. *S. sessilifolia.*
Leaves silvery-velvety on both sides .... 7. *S. macrostachya.*
Stigmas short and thick.
Capsules pubescent .... 5. *S. argophylla.*
Capsules glabrous.
Leaves canescent, at least when young, entire or denticulate .... 6. *S. exigua.*
Leaves green, glabrous, pale beneath, usually prominently serrate .... 4. *S. melanopsis.*
Scales of the aments dark (pale in *S. bebbiana*); leaves appearing with or after the aments.
Capsules glabrous.
Low shrub; leaves entire .... 8. *S. myrtilloides.*
Taller shrubs; leaves serrulate.
Leaves not shiny above nor glaucous beneath, subcordate .... 9. *S. cordata.*
Leaves glaucous beneath, shining green above, not subcordate .... 10. *S. piperi.*
Capsules pubescent.
Tall shrubs or trees, not alpine.
Aments sessile, appearing with or before the leaves.
Scales black.
Style none.
Capsule pubescent .... 11. *S. scouleriana.*
Capsule tomentose .... 12. *S. hookeriana.*
Style elongate .... 13. *S. bella.*
Scales pink or pale .... 14. *S. bebbiana.*
Aments peduncled, appearing with the narrow leaves .... 15. *S. geyeriana.*
Low alpine shrubs.
Stems erect, 1 to 2 meters high.
Leaves glabrous above, glaucous beneath. 16. *S. barclayi.*
Leaves pubescent on both sides .... 17. *S. commutata.*
Stems prostrate.
Leaves acute at each end .... 18. *S. tenera.*
Leaves obtuse, reticulate-veiny.
Leaves 1 to 3 cm. long, aments many-flowered .... 19. *S. saximontana.*
Leaves .5 to 1 cm. long, aments 3 to 12-flowered .... 20. *S. nivalis.*

1. **Salix amygdaloides** Anders. Proc. Am. Acad. **4:** 53. 1858.

TYPE LOCALITY: "Fort Pierre, Missouri."

RANGE: British Columbia to Quebec, southward to New York, Texas, and Oregon.

SPECIMENS EXAMINED: West Klickitat County, *Suksdorf*, June 20 and 22, 1883; Yakima County, *Tweedy* in 1882; Wawawai, *Piper* 1932, 3591; Almota, *Piper* 1776.

ZONAL DISTRIBUTION: Upper Sonoran.

2. **Salix lasiandra** Benth. Pl. Hartw. 335. 1857.

Salix lasiandra lyallii Sarg. Gard. & Forest **8:** 463. 1895.

Salix lyallii Heller, Bull. Torr. Club **25:** 580. 1898.

TYPE LOCALITY: "Ad flumen Sacramento," California.

RANGE: British Columbia to California.

SPECIMENS EXAMINED: Montesano, *Heller* 3856; Clallam County, *Elmer* 2429; west Klickitat County, *Suksdorf,* May 20, 1886; Cowlitz, *Engelman & Sargent,* August 16, 1880; Nisqually Valley, *Allen* 109; Lake Chelan, *Lake & Hull,* August 12, 1892; Stehekin, *Griffiths & Cotton* 191.

ZONAL DISTRIBUTION: Humid Transition.

Hooker (Fl. Bor. Am. **2**: 148) erroneously referred our plant to *S. lucida* Muhl.

2a. Salix lasiandra caudata (Nutt.) Sudw. Bull. Torr. Club **20**: 43. 1893.

Salix pentandra caudata Nutt. Sylva **1**: 61. 1842.

Salix fendleriana Anders. Ofv. Vet. Akad. Foerh. **15**: 115. 1858.

Salix lasiandra fendleriana Bebb in S. Wats. Bot. Cal. **2**: 84. 1880.

TYPE LOCALITY: "By streams in the valleys of the Rocky Mountains toward their western slope, in Oregon, and also in the Blue Mountains of the same territory."

RANGE: British Columbia to New Mexico and Arizona.

SPECIMENS EXAMINED: Ellensburg, *Whited* 332; Wenache, *Whited* 1044; Cottonwood Creek, *Vasey* in 1901; Thorn Creek, *Vasey* in 1901; Mabton, *Cotton* 369; Cascade Mountains, *Watson* 368; Rock Lake, *Sandberg & Leiberg* 111; Ritzville, *Sandberg & Leiberg* 197; Sprague, *Sandberg & Leiberg* 197; Blue Mountains, *Piper,* July 17, 1896; Waitsburg, *Horner* 449, 450; Pullman, *Elmer* 835; *Piper* 1775; *Hull* 768; without locality, *Vasey* in 1889; Cow Creek, *Griffiths & Cotton* 539; North Yakima, *Griffiths & Cotton* 60.

ZONAL DISTRIBUTION: Upper Sonoran and Arid Transition.

3. Salix sessilifolia Nutt. Sylva **1**: 68. 1842.

TYPE LOCALITY: "On the rocky borders of the Oregon at the confluence of the Wahlamet."

This species is included in Suksdorf's list, but we have seen no Washington specimens. As it is abundant at the mouth of the Willamette, however, it will certainly be found on the north bank of the Columbia.

4. Salix melanopsis Nutt. Sylva **1**: 78. 1842.

TYPE LOCALITY: "At Fort Hall * * * on the alluvial lands of Lewis River," Idaho. Collected by Nuttall.

RANGE: British Columbia to Idaho and Oregon.

SPECIMENS EXAMINED: Snoqualmie Falls, *Piper & Smith* 614; Yelm Prairie, *Piper,* August 5, 1889; Trout Lake, *Suksdorf* 36, 38, 37; Klickitat River, *Suksdorf* 35; North Yakima, *Elmer* 1081; Conconully Creek, *Griffiths & Cotton* 315; Peshastin, *Sandberg & Leiberg* 480; Spokane, *Piper* 3522; Wawawai, *Piper* 2915, 3597, 3593.

ZONAL DISTRIBUTION: Upper Sonoran and Transition.

5. Salix argophylla Nutt. Sylva **1**: 71. 1842.

TYPE LOCALITY: "On the Boise River, toward its junction with the Shoshonee," Idaho. Collected by Nuttall.

RANGE: Washington, Oregon, and Idaho.

SPECIMENS EXAMINED: West Klickitat County, *Suksdorf* 34, 6; North Yakima, *Henderson,* May 26, 1892; Conconully, *Griffiths & Cotton* 276; Cow Creek, *Griffiths & Cotton* 528; Sprague, *Sandberg & Leiberg* 134; North Palouse River, *Vasey* in 1901.

ZONAL DISTRIBUTION: Upper Sonoran.

6. Salix exigua Nutt. Sylva **1**: 75. 1842.

TYPE LOCALITY: "A native of the territory of Oregon." According to Nuttall this species grows with *S. fluviatilis* Nutt. on "the immediate border of the Oregon below its confluence with the Wahlamet."

RANGE: Washington, Oregon, Idaho.

SPECIMENS EXAMINED: Ellensburg, *Whited* 333; Crab Creek, *Lake & Hull* 767; Thorn Creek, *Vasey* in 1901; Pullman, *Piper* 3585; Almota, *Piper* 3586; Wawawai, *Piper* 3596, 1774, 3594.

Zonal distribution: Upper Sonoran and Arid Transition.

This differs from *S. argophylla* only in its glabrous capsules, and intermediate examples are abundant.

7. **Salix macrostachya** Nutt. Sylva **1**: 72. 1845.

Type locality: "On the banks of the Oregon." Collected by Nuttall.

Range: Washington and probably Oregon.

Specimens examined: Wawawai, *Piper* 2916, 3592, 3595.

Zonal distribution: Upper Sonoran.

A very rare species. All the above specimens are staminate, no pistillate bushes having been seen.

8. **Salix myrtilloides** L. Sp. Pl. **2**: 1019. 1753.

Type locality: "Habitat in Suecia septentrionali."

Range: Arctic regions southward to Washington and Connecticut. Europe.

Specimens examined: Seattle, *Piper* 672; Mount Adams, *Henderson*, August 5, 1892; *Flett* 1348; *Henderson* in 1883; McAllisters Lake, *Henderson*, June 22, 1892; White Salmon, *Suksdorf* in 1879.

Zonal distribution: Canadian?

This species occurs only in sphagnum bogs.

9. **Salix cordata** Muhl. Neue Schr. Ges. Naturf. Berlin **4**: 236. 1803.

Type locality: Pennsylvania.

Range: British Columbia to New Brunswick, south to California, Colorado, and Pennsylvania.

Specimens examined: Seattle, *Piper* 559; North Yakima, *Henderson*, May 26, 1892; Wenache, *Whited* 1014, 1020; Cottonwood Creek, *Vasey* in 1901; Thorn Creek, *Vasey* in 1901; North Palouse River, *Vasey* in 1901; Spokane Valley, *Watson* 373; Hangman Creek, *Sandberg & Leiberg* 29, 6, 11; without locality, *Brandegee* 1080; Almota, *Piper*, May 29, 1894; Pullman, *Piper* 3588; *Elmer* 111; Prosser, *Griffiths & Cotton* 14; Wenache Mountains, *Griffiths & Cotton* 109; Conconully, *Griffiths & Cotton* 318; Riverside, *Griffiths & Cotton* 369.

Zonal distribution: Transition.

10. **Salix piperi** Bebb, Gard. & For. **8**: 482. 1895.

Type locality: Seattle, Washington.

Range: Washington and Oregon.

Specimens examined: Hoquiam, *Lamb* 1004; Seattle, *Piper* in 1888; Olympia, *Henderson*, August 23, 1892; Yelm Prairie, *Piper* in 1888; Spokane, *Piper*, September 3, 1896; Pullman, *Piper* 1777, 3587, 3598; Columbia River, *Suksdorf* in 1886.

Zonal distribution: Transition.

All the Washington specimens that have been referred to *S. lasiolepis bigelovii* (Torr.) Bebb seem to belong rather to *S. piperi*, which is perhaps only of subspecific rank.

11. **Salix scouleriana** Barratt: Hook. Fl. Bor. Am. **2**: 145. 1838.

Salix flavescens Nutt. Sylva **1**: 65. 1842.

Salix nuttallii Sargent, Gard. & For. **8**: 463. 1895.

Salix capreoides Anders. Proc. Am. Acad. **4**: 60. 1858.

Type locality: "North West America, on the Columbia. *Dr. Scouler.* Fort Vancouver. *Tolmie.*"

Range: Vancouver Island to Assiniboia, south to California and New Mexico.

Specimens examined: Elleinsburg, *Whited* 1267; Thorn Creek, *Vasey* in 1901; Cottonwood Creek, *Vasey* in 1901; Wenache, *Whited* 7; Larm River, *Suksdorf* 24, 25; White Salmon, *Suksdorf* in 1879; Fort Vancouver, *Tolmie*; Seattle, *Engelmann & Sargent*, July 18, 1880; *Piper* in 1890; without locality, *Brandegee* 1084; Spokane Valley, *Watson* 367, 372; Spangle, *Piper* 3012; Wilson Creek, *Lake & Hull*, September 1, 1892; Skagit Pass, *Lake*

& Hull, August 24, 1892; Almota, *Piper* 1931; Pullman, *Piper* 2923; *Elmer* 84; Waitsburg, *Horner* 448;

ZONAL DISTRIBUTION: Transition and Canadian.

An exceedingly variable species as to foliage and habit, but in floral characters apparently not capable of being divided. In rich soils it often becomes a tree 10 to 20 meters high and 15 to 40 cm. in diameter. The young leaves and bark have a peculiar fetid odor. Owing to the fact that Tolmie's specimens were a mixture of this species and of *S. sitchensis* Sanson, some botanists have discarded the name *scouleriana*. It is, however, not probable that the real types, namely, Scouler's specimens, were similarly a mixture, hence the action is not justifiable. Barratt's original types seem to be lost.

12. **Salix hookeriana** Barratt; Hook. Fl. Bor. Am. **2**: 145. 1838.

TYPE LOCALITY: "Near the Grand Rapids of the Sashatchewan, rare. *Douglas*. Northwest Coast of America. *Scouler*." The former locality is doubtless erroneous.

RANGE: Near the seashore, Vancouver Island to southwestern Oregon.

SPECIMENS EXAMINED: Grays Harbor City, *Lamb* 1035; Cohasset Beach, *Lamb* 1126; Long Beach, *Henderson*, September 6, 1891; Seattle, *Piper* 887.

ZONAL DISTRIBUTION: Humid Transition.

13. **Salix bella** Piper, Bull. Torr. Club. **27**: 399. 1900.

TYPE LOCALITY: Garrison, Whitman County, Washington.

RANGE: Washington and Idaho.

SPECIMENS EXAMINED: Klickitat River, *Flett* 1342; Spokane, *Piper* 3517; Garrison, *Henderson*, October 14, 1895, August 18, 1895, May 5, 1896, April 4, 1896; *Piper* 2922, 3590; Mount Adams, *Suksdorf*, July 11, August, 1886.

ZONAL DISTRIBUTION: Arid Transition.

14. **Salix bebbiana** Sargent, Gard. & For. **8**: 463. 1895.

Salix rostrata Richards. Bot. App. Frankl. Journ. 753. 1823, not Thuill. 1799.

TYPE LOCALITY: British America, latitude 54° to 64°.

RANGE: British Columbia to Ontario southward to Pennsylvania and Arizona.

SPECIMENS EXAMINED: Lower Fraser Valley, latitude 49°, *Lyall* in 1859; Falcon Valley, *Suksdorf* 21, 43, 44; Cottonwood Creek, *Vasey* in 1901; North Palouse River, *Vasey* in 1901; Rattlesnake Mountains, *Cotton* 325; Coulee City, *Lake & Hull*, August 6, 1892; Spokane, *Watson* 370; Spokane Valley, *Lyall* in 1860; Hangman Creek, *Sandberg & Leiberg* 12; Pullman, *Piper* 1772, 3589; *Elmer* 72; without locality, *Vasey* in 1889; Wenache Mountains, *Griffiths & Cotton* 105; Conconully, *Griffiths & Cotton* 309; Steamboat Rock, *Griffiths & Cotton* 428.

ZONAL DISTRIBUTION: Arid Transition and Upper Sonoran.

15. **Salix geyeriana** Anders. Proc. Am. Acad. **4**: 63. 1858.

Salix macrocarpa Nutt. Sylva **1**: 67. 1842, not Trautv. 1832.

TYPE LOCALITY: "Hab. Missouri v. Oregon." Collected by Geyer.

RANGE: British Columbia to Oregon.

SPECIMENS EXAMINED: Seattle, *Piper* 673; Olympia, *Henderson* in 1892; upper Nisqually, *Allen* 107; Olympia, *Henderson* in 1892; Yelm Prairie, *Piper* in 1888; Atanum River, *Flett* 1345, 1352; Falcon Valley, *Suksdorf;* Columbia banks, *Nuttall.*

ZONAL DISTRIBUTION: Humid Transition.

16. **Salix barclayi** Anders. Proc. Am. Acad. **4**: 66. 1858.

Salix conjuncta Bebb, Bot. Gaz. **13**: 111. 1888.

TYPE LOCALITY: Kodiak, Alaska.

RANGE: Alaska to Montana and Oregon.

SPECIMENS EXAMINED: Olympic Mountains, *Piper*, August, 1895; *Elmer* 2427; Mount Rainier, *Piper* 2163, 700; *Smith* 701; Mount Adams, *Henderson*, August 4, 1892; *Suksdorf;* Stevens Pass, *Sandberg & Leiberg* 721; Skamania County, *Suksdorf* 22; Bridge Creek, *Elmer* in 1897; Hell Roaring River, *Cotton* 1530.

ZONAL DISTRIBUTION: Arctic and Hudsonian.

17. Salix commutata Bebb, Bot. Gaz. **13**: 110. 1888.

Type locality: Alpine bogs, Eagle Creek, Wallowa Mountains, Oregon.

Range: Washington and Oregon.

Specimens examined: Olympic Mountains, *Piper*, August, 1895; Mount Rainier, *Smith*, August, 1890; Cascade Mountains, 1,940 meters altitude, *Tweedy;* Stevens Pass, *Sandberg & Leiberg*, 757.

Zonal distribution: Arctic and Hudsonian.

17a. Salix commutata mixta nom. nov.

Salix commutata sericea Bebb, Bot. Gaz. **13**: 111. 1888, not *S. sericea* Muhl.

Type locality: "North side of Mt. Hood," Oregon.

Range: Washington and Oregon.

Specimens examined: Olympic Mountains, *Piper*, August, 1890; *Flett* 112; Horseshoe Basin, *Lake & Hull* 765.

17b. Salix commutata denudata Bebb, Bot. Gaz. **13**: 111. 1888.

Type locality: Eagle Creek meadows, Wallowa Mountains, Oregon.

Range: Washington and Oregon.

Specimens examined: Cascade Mountains, *Tweedy* in 1882.

Salix commutata differs in but slight and seemingly inconstant characters from *S. barclayi*. Additional material and field study is needed to clear up their relationships.

18. Salix tenera Anders.; DC. Prod. **16**^{2}: 288. 1864.

Type locality: "Ad Cascade Mountain, Lat. 49°, alt. 7,000 ped." Collected by Lyall.

Range: Cascade Mountains, Washington and British Columbia.

Specimens examined: Cascade Mountains, latitude 49°, *Lyall* in 1860; mountains north of Ellensburg, *Brandegee* 1083; Mount Rainier, *Flett* 2118.

Zonal distribution: Arctic.

19. Salix saximontana Rydberg, Bull. N. Y. Bot. Gard. **1**: 261. 1899.

Type locality: Grays Peak, Colorado.

Range: Washington and Montana to Colorado and California.

Specimens examined: Mount Rainier, *Flett* 2119.

Zonal distribution: Arctic.

Probably not specifically distinct from *S. nivalis*.

20. Salix nivalis Hook. Fl. Bor. Am. **2**: 152. 1839.

Type locality: "Near the summits of the peaks in the Rocky Mountains."

Range: Washington to Montana and Wyoming.

Specimens examined: Mount Rainier, *Flett* 2278.

Zonal distribution: Arctic.

21. Salix sitchensis Sanson in Bong. Mem. Acad. St. Petersb. VI. **2**: 162. 1832.

Salix cuneata Nutt. Sylva. **1**: 66. 1842.

Type locality: Sitka.

Range: Alaska to middle California, eastward to the Blue Mountains.

Specimens examined: Clallam County, *Elmer* 2428; Seattle, *Piper* 557; *Smith* in 1889; Tacoma, *Flett* 31; Nisqually, *Allen* 108, White Salmon, *Suksdorf* in 1879; Atanum River, *Flett* 1346; Mount Adams, *Suksdorf* 31; west Klickitat County, *Suksdorf* 24; Skagit Pass, *Lake & Hull* 809; Stevens Pass, *Sandberg & Leiberg* 720; Spokane, *Sandberg & Leiberg*, May, 1893; Hangman Creek, *Sandberg & Leiberg* 72; Blue Mountains, *Piper*, August 2, 1896; Stehekin, *Griffiths & Cotton* 243.

Zonal distribution: Transition and Canadian.

Salix chlorophylla Anders. Vet. Acad. Handl. Stock. **6**: 138. 1867. Imperfect specimens of a willow collected by Suksdorf on Mount Adams, July 31, 1883, and in the mountains of Skamania County, September 6, 1883, are referred to this species with much hesitation.

SALIX CINEREA L. Sp. Pl. **2**: 1021. 1753. Anderson[a] refers thus, but doubtfully, a specimen collected by Geyer (no. 636) in "thickets along rivulets, Columbia River Valley near Fort Colville," said to be "15-20 feet high, shrubby." Hooker[b] calls the same specimen *S. grisea?* We have not seen the specimen, but suspect it to be a form of *S. bebbiana*.

SALIX LONGIFOLIA Muhl. does not occur in our limits, all such references pertaining to closely related species.

POPULUS.

Bark smooth; petioles flattened; capsules oblong-conic, smooth .... 1. *P. tremuloides*.
Bark rough; petioles terete; capsule globose, hairy .... 2. *P. trichocarpa*.

1. **Populus tremuloides** Michx. Fl. **2**: 243. 1803. ASPEN.

TYPE LOCALITY: "Hab. in Canada et Noveboraco."

RANGE: Alaska to Labrador, southward to Pennsylvania, Missouri, New Mexico, and California.

SPECIMENS EXAMINED: Egbert Springs, *Sandberg & Leiberg* 391; Darling Mountains, *Flett* 1350; Pullman, *Piper;* Wenas, *Griffiths & Cotton* 104.

ZONAL DISTRIBUTION: Transition.

Two apparently distinct aspens occur in eastern Washington and we suspect that neither is good *P. tremuloides*. The herbarium material is, however, very imperfect and the settlement of the problem must await more field study and better collections.

2. **Populus trichocarpa** Torr. & Gray; Hook. Icon. **9**: *t. 878.* 1852. COTTONWOOD.

Populus balsamifera γ Hook. Fl. Bor. Am. **2**: 154. 1839.

TYPE LOCALITY: Santa Clara River near Buenaventura, California. Collected by Parry.

RANGE: British Columbia to Montana and California.

SPECIMENS EXAMINED: Egbert Springs, *Sandberg & Leiberg* 394; Atanum River, *Flett* 1343; Wenache Mountains, *Whited* 1343; Spokane, *Piper*, July 26, 1896; Colfax, *Piper*, August 2, 1896; Almota, *Piper* 1791; Wenas, *Griffiths & Cotton* 69.

ZONAL DISTRIBUTION: Transition and Upper Sonoran.

In Cooper's report this tree was referred to *Populus angustifolia* James, a species that is not known in Washington.

POPULUS BALSAMIFERA Ait. has several times been ascribed to Washington, but there are no specimens to substantiate the ascription, all thus referred so far as seen being *P. trichocarpa*.

MYRICACEAE. SWEET GALE FAMILY.

MYRICA.

Leaves evergreen, 5 to 10 cm. long; tree 3 to 6 meters high .... 2. *M. californica*.
Leaves deciduous, 2 to 5 cm. long; shrub about 1 meter high .... 1. *M. gale*.

1. **Myrica gale** L. Sp. Pl. **2**: 1024. 1753. SWEET GALE.

TYPE LOCALITY: Europe.

RANGE: Alaska to Newfoundland, southward to Washington, Michigan, and New York. Asia. Europe.

SPECIMENS EXAMINED: Weiser Lake, *Suksdorf* 1003; Ilwaco, *Henderson* 2164; Seattle, *Piper* in 1887.

ZONAL DISTRIBUTION: Humid Transition and Canadian.

2. **Myrica californica** Cham. Linnaea **6**: 535. 1831.

TYPE LOCALITY: "Ad portum sancti Francisci Californiae."

RANGE: Seacoasts, Washington to California.

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[a] Proc. Am. Acad. **4**: 60. 1858.

[b] Kew Gard. Misc. **7**: 372. 1855.

Specimens examined: Cohasset, *Lamb* 1122; Ilwaco, *Henderson*, September 9, 1892; Westport, *Heller* 394; *Henderson*, June 26, 1892; Ilwaco, *Piper* 4952.

Zonal distribution: Humid Transition.

BETULACEAE. Birch Family.

Fruit a nut inclosed in a leafy involucre.................................... Corylus.
Fruit cone-like, without involucre.
  Cone scales deciduous.. Betula.
  Cone scales persistent.. Alnus.

CORYLUS.

1. **Corylus californica** (A. DC.) Rose, Gard. & For. **8**: 263. 1895. Hazel.

Corylus rostrata californica A. DC. Prod. $\mathbf{17^2}$: 133. 1864.

Corylus americana Walt. err. det. Cooper, Pac. R. Rep. $\mathbf{12^2}$: 68. 1860.

Type locality: Santa Cruz, California.

Range: British Columbia to California.

Specimens examined: Montesano, *Heller* 3971; Seattle, *Piper* 189; west Klickitat County, *Suksdorf* 1214; Sumas, *Lyall;* Fort Colville, *Watson;* without locality, *Vasey* in 1889; Box Canyon, *Kreager* 410; Kettle Falls, *Beattie & Chapman* 2191.

Zonal distribution: Transition.

BETULA. Birch.

Branchlets glandular-warty.
  Shrub about 1 meter high; leaves glabrous...................... 1. *B. glandulosa.*
  Shrub or tree 3 to 6 meters high; leaves sparsely pubescent...... 3. *B. microphylla.*
Branchlets not glandular-warty; tree with gray bark................ 2. *B. occidentalis.*

1. **Betula glandulosa** Michx. Fl. **2**: 180. 1803.

Type locality: "Circa lacus, a sinu Hudsonis ad Mistassins."

Range: Oregon and Colorado to New England and northward.

Specimens examined: Cascade Mountains, latitude 49°, *Lyall* in 1860; Seattle, *Piper*, May 25, 1891; Tacoma, *Flett* 29; Steilacoom, *Piper* 183; McAllisters Lake, *Henderson*, June 22, 1892; Klickitat County, *Suksdorf*; Falcon Valley, *Suksdorf*; Klickitat River, *Flett* 1344.

Zonal distribution: Canadian? Always found in sphagnum bogs.

2. **Betula occidentalis** Hook. Fl. Bor. Am. **2**: 155. 1839.

Betula piperi Britt. Bull. Torr. Club **31**: 165. 1904.

Type locality: "Straits of De Fuca." Collected by Scouler.

Range: British Columbia, Washington, and Idaho.

Specimens examined: Gulf of Georgia, *Henderson* in 1888; Everson, *Piper*, September, 1892; Sumas Prairie, *Lyall* in 1858 59; Cascade Mountains, latitude 49°, *Lyall* in 1859; Tukanon River, *Lake & Hull*, July 5, 1892; Blue Mountains, *Piper*, July 15, 1896; ten miles southwest Pullman, *Piper* 3807.

Zonal distribution: Transition.

This is the *Betula lutea* Michx.? of Suksdorf's List.

A variable tree as it occurs in Washington and perhaps only a subspecies of the eastern *B. papyrifera.* Typical *occidentalis* occurs in northwestern Washington, where it is a rather dark-gray barked tree, occasionally 3 feet in diameter. The very similar tree in Stevens County and in the Blue Mountains is somewhat smaller in size and often white-barked. The name *Betula piperi* was meant by its author to apply to the third unnamed species in the Flora of the Palouse Region, but the specimen actually cited is the eastern Washington form of *B. occidentalis* Hook.

3. **Betula microphylla** Bunge, Mem. Acad. St. Petersb. VI. **2**: 606. 1835.

Betula fontinalis Sargent, Bot. Gaz. **31**: 239. 1901.

Type locality: "Hab. ad Tschujae ripam in deserto curaico," Siberia.

Range: British Columbia to Alberta, south to California and New Mexico. Siberia.

Specimens examined: Wenache, *Whited* 1003; Coulee City, *Lake & Hull* 790; Spokane, *Sandberg & Leiberg* in 1893; Hangman Creek, *Sandberg & Leiberg* 76; Pullman, *Elmer* 882; Touchet River, Waitsburg, *Piper*, July 19, 1896; Almota, *Piper* 1642, April 20, 1895; without locality, *Vasey* in 1889; ten miles southwest of Pullman, *Piper* 3808, 3806; Conconully, *Griffiths & Cotton* 317; Wenache, *Griffiths & Cotton* 149; Colville Reservation, *Griffiths & Cotton* 380.

Zonal distribution: Arid Transition.

The Almota specimens form the basis for the third unnamed species in the Flora of the Palouse Region. This is a tall graceful tree with drooping branches, appearing very different from the ordinary form of *B. microphylla*, and probably distinct from it.

ALNUS. Alder.

Leaves simply denticulate, not at all lobed .... 1. *A. rhombifolia*.
Leaves doubly dentate and more or less lobed.
  Peduncles slender, longer than the cones; shrub with shining leaves. 2. *A. sinuata*.
  Peduncles shorter than the cones; leaves dull.
    Winter buds acute; leaves rusty pubescent on the veins beneath. 3. *A. oregona*.
    Winter buds obtuse; leaves pubescent but not rusty......... 4. *A. tenuifolia*.

1. **Alnus rhombifolia** Nutt. Sylva **1**: 33. 1842.

Type locality: Monterey, California.

Range: British Columbia to Idaho and California.

Specimens examined: Bingen, *Suksdorf* 224; Satus Creek, *Brandegee* 1078; Blue Mountains, *Piper*, August 2, 1896; Almota, *Piper* 1635, May 2, 1897; September 9, 1896; Wawawai, *Piper*; *Elmer* 896.

Zonal distribution: Upper Sonoran.

2. **Alnus sinuata** (Regel) Rydberg, Bull. Torr. Club **24**: 190. 1897.

Alnus viridis sinuata Regel in DC. Prod. **26**^{2}: 183. 1868.

Type locality: Kamchatka.

Range: Alaska to Oregon and Colorado. Siberia.

Specimens examined: Cascade Mountains, latitude 49°, *Lyall* in 1860; Seattle, *Piper*, July 4, 1897; Baldy Peak, *Lamb* 1341; Olympia, *Henderson*; Steilacoom, *Cooper*; Silverton, *Bouck* 168; Nisqually Valley, *Allen* 309; Klickitat River, *Flett* 1347; Chambers Lake, *Henderson*, June 20, April 10, 1892; Nason Creek, *Sandberg & Leiberg* 609; Bridge Creek, *Elmer* 711; Blue Mountains, *Piper* 2415; without locality, *Vasey* in 1889; Stehekin, *Griffiths & Cotton* 218.

Zonal distribution: Hudsonian to Transition.

A species of wide altitudinal range, most abundant along subalpine streams, but occasionally occuring at sea level. It is usually a shrub, but sometimes truly arborescent. It has been confused with the eastern *A. viridis* DC.

3. **Alnus oregona** Nutt. Sylva **1**: 28. 1842. Red alder.

Alnus rubra Bong. Mem. Acad. St. Petersb. VI. **2**: 162. 1837, not *Betula-alnus rubra* Marsh. 1785.

Type locality: "In our progress to the west we first observed this tree on the borders of the Rivers Boisee and Brulee, which pass into the Shoshonee not far from Walla Walla, and at intervals it continues more or less common to Point Chinook, near the shores of the Pacific." Nuttall has here confused two species, as *A. oregona* occurrs only west of the Cascade Mountains.

Range: Alaska to middle California in the coast region.

SPECIMENS EXAMINED: Clallam County, *Elmer* 2759; Hoquiam, *Lamb* 1022; Olympia, *Henderson*, August 23, 1892; upper Valley Nisqually, *Allen* 211; west Klickitat County, *Suksdorf* 2184.

ZONAL DISTRIBUTION: Humid Transition.

For illustration see Plate VIII, facing page 41.

4. **Alnus tenuifolia** Nutt. Sylva **1**: 32. 1842.

Alnus incana virescens Wats. Bot. Cal. **2**: 81. 1880.

Alnus occidentalis Dippel, Handb. Laubh. **2**: 158. 1892.

TYPE LOCALITY: "On the borders of small streams within the range of the Rocky Mountains, and afterwards in the vallies of the Blue Mountains of Oregon."

RANGE: British Columbia to California and New Mexico.

SPECIMENS EXAMINED: Peshastin Creek, *Watson* 363, October 16, 1880; Peshastin, *Sandberg & Leiberg* 543; Falcon Valley, *Suksdorf* 2193, 2183; Ellensburg, *Whited* 256; *Elmer* 413, July, 1897; Wenache, *Whited* 52, 1002; Atanum River, *Flett* 1351; Pleasant Valley, *Lake & Hull*, August 2, 1892; Spokane, *Piper*, July 2, 1896, September 3, 1896; Blue Mountains, *Piper*, July 16, 1896; Pullman, *Piper*, August, 1896, January, 1896; Mount Carlton, *Kreager* 226.

ZONAL DISTRIBUTION: Arid Transition.

FAGACEAE. BEECH FAMILY.

Involucre 1-flowered, becoming a scaly cup.............................. QUERCUS.
Involucre 1 to 3-flowered, becoming a prickly bur........................ CASTANOPSIS.

QUERCUS. OAK.

1. **Quercus garryana** Dougl.; Hook. Fl. Bor. Am. **2**: 159. 1839.

Quercus jacobi R. Br. Campst. Ann. & Mag. Nat. Hist. IV. **7**: 255. 1871.

Quercus gilberti Greene, West Coast Oaks 77. *pl.* *37*. 1889.

TYPE LOCALITY: "Plentiful on plains near Ft. Vancouver, on the Multnomah, and at Puget Sound."

RANGE: Vancouver Island to California in the coast region.

SPECIMENS EXAMINED: Swauk, *Watson* 365; White Salmon, *Suksdorf* 308; Tampico, *Flett;* near Mount Adams, *Cotton* 1495; Seattle, *Piper;* Steilacoom, *Piper;* Fairhaven, *Piper* in 1892; Bingen, *Piper* 6453, 6454.

ZONAL DISTRIBUTION: Transition.

Professor Greene considers the Washington-British Columbia form as a different species from that of California, but if this is so, it is the California plant that should have its name altered, as all the above names belong to the northern plant. *Quercus gilberti* is the low, often prostrate, oak occurring about the Gulf of Georgia and locally known as vine oak. It is remarkably variable in foliage, but no fruiting specimens have been found. In sheltered places it assumes the ordinary form of *Q. garryana*.

For an illustration of this species see Plate IX, facing page 42.

CASTANOPSIS.

1. **Castanopsis chrysophylla** (Dougl.) A. DC. in Seem. Journ. Bot. **1**: 182. 1863.

Castanea chrysophylla Dougl.; Hook. Fl. Bor. Am. **2**: 159. 1839.

TYPE LOCALITY: "On the Grand Rapids of the Columbia." Collected by Douglas.

RANGE: Washington to middle California.

SPECIMENS EXAMINED: Moffatt's Springs, Skamania County, *Gorman*, May 15, 1904, the only known station north of the Columbia River.

ULMACEAE. Elm Family.

CELTIS.

1. **Celtis douglasii** Planch. Ann. Sci. Nat. III. 10: 293. 1848. HACKBERRY.

TYPE LOCALITY: "In aridis scopulosis regionem interiorum, secus flumen Columbia." Collected by Douglas.

RANGE: Washington, Oregon, and Idaho.

SPECIMENS EXAMINED: West Klickitat County, *Suksdorf* 39; Snake River region, *Brandegee* 1073; Almota, *Piper*, May 2, 1897; Wawawai, *Elmer* 1016; *Piper* 1511 and October, 1893.

ZONAL DISTRIBUTION: Upper Sonoran.

Our tree has been referred to both *C. occidentalis* L. and *C. reticulata* Torr. It is perhaps only a geographical race of the former. Ordinarily it is a very scraggly tree, with very scabrous leaves, commonly distorted by insect work. In irrigated land, however, it is a graceful and attractive tree, the leaves becoming thinner, darker green, and much less rough.

The Wilkes Expedition specimens are said to have been collected at Port Discovery, but this is probably an error.

URTICACEAE. Nettle Family.

Leaves opposite, possessing stinging hairs	URTICA.
Leaves alternate; no stinging hairs	PARIETARIA.

URTICA. Nettle.

Leaves soft-pubescent on both sides	1. *U. holosericea.*
Leaves glabrous above, sparsely pubescent beneath	2. *U. lyallii.*

1. **Urtica holosericea** Nutt. Journ. Acad. Phila. II. 1: 183. 1847.

TYPE LOCALITY: "Near Monterey, Upper California."

RANGE: Washington and Idaho to California.

SPECIMENS EXAMINED: Yakima County, *Henderson* 2498; west Klickitat County, *Suksdorf* 1381; Marshall Junction, *Piper*, July 2, 1896; Almota, *Piper*, September 9, 1896; Union Flat, *Piper* 3045; Wawawai, *Piper* 1509.

ZONAL DISTRIBUTION: Upper Sonoran and Arid Transition.

2. **Urtica lyallii.** S. Wats. Proc. Am. Acad. 10: 348. 1875.

TYPE LOCALITY: "In the Cascade Mts. in lat. 49°." Collected by Dr. Lyall.

RANGE: British Columbia to Idaho and California.

SPECIMENS EXAMINED: Montesano, *Heller* 3920; Clallam County, *Elmer* 2760; Seattle, *Piper* 2316; Cascade Mountains, 49°, *Lyall;* Ellensburg, *Brandegee* 1075; Klickitat County, *Suksdorf* 58; Horseshoe Basin, *Elmer* 709; Wilson Creek, *Lake & Hull* 654; Spokane, *Piper*, July 2, 1896; Blue Mountains, *Lake* 654; *Piper*, July 17, 1896; Union Flat, *Piper* 3046; Pullman, *Piper* 3046, 1510; Clarks Springs, *Kreager* 42.

ZONAL DISTRIBUTION: Transition.

Washington specimens referred to *U. gracilis* Ait. belong here, as does the specimen listed by Suksdorf as "*U. breweri*(?)." Specimens from the immediate seacoast tend to have thicker, more deeply cordate leaves, but this character is apparently due to maritime influences and is not sufficient to distinguish the plant.

PARIETARIA.

1. **Parietaria pennsylvanica** Muhl.; Willd. Sp. Pl. 4^2: 955. 1805.

TYPE LOCALITY: "Habitat in Pennsylvania."

RANGE: British Columbia to Canada, southward to Florida and Mexico.

SPECIMENS EXAMINED: White Salmon, *Suksdorf* 487; without locality, *Brandegee* 1076; Almota, *Lake & Hull* 707; *Piper* 1507; Wawawai, *Elmer* 755.

ZONAL DISTRIBUTION: Upper Sonoran.

LORANTHACEAE. MISTLETOE FAMILY.

RAZOUMOFSKYA.

Staminate flowers paniculate, nearly all terminal on distinct peduncle-like joints .... 1. *R. americana.*
Staminate flowers forming simple or compound spikes.
  Stems stout, 5 to 12 cm. high .... 2. *R. campylopoda.*
  Stems short, 1 to 4 cm. high .... 3. *R. douglasii.*
    On *Tsuga heterophylla* .... 3a. *R. douglasii tsugensis.*
    On *Larix occidentalis* .... 3b. *R. douglasii laricis.*
    On *Abies grandis* .... 3c. *R. douglasii abietina.*

1. **Razoumofskya americana** (Nutt.) Kuntze, Rev. Gen. Pl. **2**: 587. 1891.

Arceuthobium americanum Nutt.; Engelm. Bost. Journ. Nat. Hist. **6**: 214. 1850.

TYPE LOCALITY: Oregon. Collected by Nuttall.

RANGE: British Columbia and Saskatchewan to California and Colorado.

SPECIMENS EXAMINED: Big Klickitat River, *Henderson* 2539, 2538; Falcon Valley, *Suksdorf* 211; near Ellensburg, *Brandegee* 1069; Spokane Valley, *Lyall* in 1861.

ZONAL DISTRIBUTION: Canadian.

Common on *Pinus contorta*, but apparently only east of the Cascade Mountains.

2. **Razoumofskya campylopoda** (Engelm.).

Arceuthobium campylopodum Engelm. Bost. Journ. Nat. Hist. **6**: 214. 1850.

Arceuthobium occidentale Engelm. in S. Wats. Bot. Cal. **2**: 107. 1880.

TYPE LOCALITY: "Oregon, on *Pinus ponderosa*." Collected by Geyer. The specimens are from north Idaho or northeast Washington, as Geyer did not collect in Oregon proper.

RANGE: British Columbia to California and Idaho.

SPECIMENS EXAMINED: West Klickitat County, *Suksdorf* 1364, 672; Peshastin, *Sandberg & Leiberg* 593; Spokane, *Piper*, July 18, 1895; *Sandberg, McDougal, & Heller* 925; Spokane Valley, *Watson;* Railroad Creek, *Elmer*, September, 1897; Medical Lake, *Elmer* 1246.

ZONAL DISTRIBUTION: Arid Transition.

Common on *Pinus ponderosa*, often forming large clusters. The staminate plants are yellow, the pistillate olivaceous. It is locally more or less well known as "snappers," owing to the explosive fruits.

3. **Razoumofskya douglasii** (Engelm.) Kuntze, Rev. Gen. Pl. **2**: 587. 1891.

Arceuthobium douglasii Engelm. in Rothr. Bot. Wheeler Surv. 253. 1878.

The typical form of this species occurs on *Pseudotsuga mucronata*. This occurs from Idaho to Arizona and New Mexico. Doubtless it will be found in Washington also. The forms on Tsuga, Larix, and Abies are apparently distinct, at least in their host relations, but satisfactory morphological characters to separate them have not been detected. They may conveniently be considered as subspecies.

3a. **Razoumofskya douglasii tsugensis** (Rosendahl).

Razoumofskya tsugensis Rosendahl, Minn. Bot. Stud. III. **2**: 272. 1903.

TYPE LOCALITY: "West coast of Vancouver island."

RANGE: British Columbia and Washington.

SPECIMENS EXAMINED: Port Ludlow, *Binns;* Seattle, *Piper* 663; Nisqually Valley, *Allen* 303.

ZONAL DISTRIBUTION: Humid Transition.

Locally abundant on *Tsuga heterophylla*, causing large "witches-brooms."

3b. **Razoumofskya douglasii laricis** subsp. nov.

RANGE: Washington and Idaho on *Larix occidentalis*.

SPECIMENS EXAMINED: Mount Adams, *Henderson* 2536; near Ellensburg, *Brandegee* 1071.

ZONAL DISTRIBUTION: Arid Transition and Canadian.

3c. **Razoumofskya douglasii abietina** (Engelm.).

Arceuthobium douglasii abietinum Engelm. in S. Wats. Bot. Cal. **2**: 106. 1880.

TYPE LOCALITY: Sierra Valley, California.

RANGE: Washington to California and Utah.

SPECIMENS EXAMINED: Falcon Valley, *Suksdorf* 2246, on *Abies grandis*.

SANTALACEAE. SANDALWOOD FAMILY.

COMANDRA.

Flowers many, corymbosely-clustered; leaves pallid.
  Leaves oblong; fruit globular .... 1. *C. umbellata.*
  Leaves linear-lanceolate; fruit ovoid .... 2. *C. pallida.*
Flowers few on axillary peduncles; leaves green .... 3. *C. livida.*

1. **Comandra umbellata** (L.) Nutt. Gen. **1**: 157. 1818.

Thesium umbellatum L. Sp. Pl. **1**: 208. 1753.

TYPE LOCALITY: "Habitat in Virginiae, Pensylvaniae pascuis siccis."

RANGE: British Columbia to Labrador southward to California and Georgia.

SPECIMENS EXAMINED: Whidby Island, *Gardner* 103; White Salmon, *Suksdorf* 494, 614; Fort Vancouver, *Tolmie*.

ZONAL DISTRIBUTION: Transition.

2. **Comandra pallida** A. DC. Prod. **14**: 636. 1857.

TYPE LOCALITY: "Prope Clearwater," Idaho. Collected by Spalding.

RANGE: British Columbia to Manitoba, Texas, and California.

SPECIMENS EXAMINED: North Yakima, *Steinweg* in 1894; *Flett* 1032; *Henderson*, May 26, 1892; Wenache, *Whited* 1073; Ellensburg, *Piper*, May 20, 1897; *Whited* 335; Morgans Ferry, *Suksdorf* 615; Cheney, *Tucker* in 1890; Columbia Valley, *Lyall* in 1861; Pasco, *Hindshaw* 26; *Piper* 2990; Crab and Wilson creeks, *Sandberg & Leiberg* 326; Sprague, *Sandberg & Leiberg* 154; Kamiak Butte, *Sandberg, McDougal, & Heller* 499; *Piper*, July 20, 1899; Almota, *Piper* 1650; Wawawai, *Piper*, May 19, 1894; *Hull*, June 4, 1892; *Elmer* 772; Kettle Falls, *Beattie & Chapman* 2206.

ZONAL DISTRIBUTION: Upper Sonoran and Arid Transition.

The nuts of this plant are sweet and edible. Where abundant, they form a favorite food for hogs.

3. **Comandra livida** Richards. Bot. App. Frankl. Journ. 734. 1823.

TYPE LOCALITY: "In shady mossy woods. Not seen to the northward of Great Slave Lake."

RANGE: Washington to Vermont and northward.

SPECIMENS EXAMINED: Box Canyon, *Kreager* 386.

ZONAL DISTRIBUTION: Canadian.

ARISTOLOCHIACEAE. BIRTHWORT FAMILY.

ASARUM.

1. **Asarum caudatum** Lindl. Bot. Reg. **17**: under *pl. 1399*. 1831. WILD GINGER.

Asarum hookeri Fielding, Sert. Plant. *pl. 32*. 1844.

Asarum canadense β Hook. Fl. Bor. Am. **2**: 139. 1838.

TYPE LOCALITY: "In pinetis prope arcem Vancouver"—that is, Fort Vancouver, Washington. Collected by Douglas.

RANGE: British Columbia and Idaho to California

SPECIMENS EXAMINED: Clallam County, *Elmer* 2834; Silverton, *Bouck* 154; Tacoma, *Flett* 58; upper Nisqually Valley, *Allen* 60; Skohomish Valley, *Kincaid*, May, 1892; Falcon Valley, *Suksdorf* 493; mouth of the Pend Oreille, *Lyall* in 1860; Nason Creek, *Sandberg & Leiberg* 625; Blue Mountains, *Piper*, July, 1896; without locality, *Vasey* in 1889; without locality, *Cooper*.

ZONAL DISTRIBUTION: Transition.

POLYGONACEAE. BUCKWHEAT FAMILY.

- Flowers not involucrate; stipules sheathing.
  - Leaves reniform; sepals 4 .... OXYRIA (p. 224).
  - Leaves not reniform; sepals 6.
    - Sepals unequal, the inner becoming much larger; stigmas tufted .... RUMEX (p. 224).
    - Sepals equal; stigmas capitate .... POLYGONUM (p. 226).
- Flowers involucrate; stipules wanting.
  - Involucre 1-flowered, coriaceous, its teeth cuspidate, often hooked .... CHORIZANTHE (p. 239).
  - Involucre several-flowered.
    - Teeth of the involucre awn-pointed.................... OXYTHECA (p. 239).
    - Teeth of the involucre unarmed........................ ERIOGONUM (p. 233).

OXYRIA.

1. **Oxyria digyna** (L.) Hill, Hort. Kew. 158. 1768. MOUNTAIN SORREL.

Rumex digynus L. Sp. Pl. **1**: 337. 1753.

TYPE LOCALITY: "Habitat in Alpibus Lapponicis, Helveticis, Wallicis."

RANGE: Alaska to Greenland, south to New England, Colorado, and California. Europe. Asia.

SPECIMENS EXAMINED: Clallam County, *Elmer* 2685; Cascade Mountains, latitude 49°, *Lyall;* Mount Rainier, *Piper* 2104; Mount Adams, *Henderson*, August 3, 1892; Horseshoe Basin, *Lake & Hull* 653; Bridge Creek, *Elmer* 692; Loomis, *Elmer* 563.

ZONAL DISTRIBUTION: Arctic.

RUMEX. DOCK.

- Flowers dioecious; leaves hastate; small species.
  - Inner sepals not longer than the granular akene.............. 1. *R. acetosella.*
  - Inner sepals longer than the smooth akene.................... 2. *R. paucifolius.*
- Flowers not dioecious; leaves not hastate; coarse species.
  - Outer sepals without tubercles.
    - Fruiting sepals cordate, 2 to 5 cm. long; leaves flat....... 3. *R. venosus.*
    - Fruiting sepals ovate, 4 to 9 mm. long.
      - Leaves flat, pale, lanceolate, rounded at base......... 4. *R. hesperius.*
      - Leaves crisped, oblong, truncate at base.............. 5. *R. occidentalis.*
  - Outer sepals, or some of them with tubercles.
    - Sepals entire or nearly so.
      - Leaves flat; all lanceolate........................... 6. *R. salicifolius.*
      - Leaves undulate, the lower cordate.
        - Panicle leafy; pedicel longer than the fruit....... 7. *R. crispus.*
        - Panicle not leafy; pedicel not longer than the fruit. 8. *R. conglomeratus.*
    - Sepals with slender teeth.
      - Annual; tubercles 3; pedicels very short............. 9. *R. persicarioides.*
      - Perennial; tubercle 1; pedicels long.................. 10. *R. obtusifolius.*

1. **Rumex acetosella** L. Sp. Pl. **1**: 338. 1753. Sheep sorrel.

Type locality: Europe.

Specimens examined: Pullman, *Piper*, July 2, 1894.

A troublesome weed throughout the State, especially in poor soils.

2. **Rumex paucifolius** Nutt. Journ. Acad. Phila. **7**: 49. 1834.

Rumex engelmanni geyeri Meisn. in DC. Prod. **14**: 64. 1856.

Rumex geyeri Trelease, Rep. Mo. Bot. Gard. **3**: 78. 1892.

Type locality: "Near Flat-Head River." Collected by Wyeth.

Range: British Columbia to Colorado and California.

Specimens examined: Wenache Mountains, *Elmer* 448; Wenache region, *Brandegee* 1068; Yakima River, *Lyall* in 1860; Flathead River, *Wyeth*; without locality, *Vasey* in 1889; Wenache Mountains, *Cotton* 1192.

Zonal distribution: Canadian.

3. **Rumex venosus** Pursh, Fl. **2**: 733. 1814.

Type locality: "In Upper Louisiana." Collected by Bradbury.

Range: Washington to Saskatchewan, south to Missouri and Nevada.

Specimens examined: Wenache, *Whited* 1224; Sunnyside, *Cotton* 382; North Yakima, *Flett* 1058; Pasco, *Hindshaw*, May 25, 1896; *Piper* 2983; Moses Lake, *Sandberg & Leiberg*, 274; Spokane, *Sandberg & Leiberg*, May, 1893; Hangman Creek, *Sandberg & Leiberg* 28; Almota, *Piper* 1549, 2940; without locality, *Vasey* 124; Moxee, *Griffiths & Cotton* 37.

Zonal distribution: Upper Sonoran.

4. **Rumex hesperius** Greene, Pittonia **4**: 234. 1901.

Type locality: "Bottom lands near Bingen, Washington." Collected by Suksdorf.

Range: Known only from the type locality.

Specimens examined: West Klickitat County, *Suksdorf* 2259.

5. **Rumex occidentalis** S. Wats. Proc. Am. Acad. **12**: 253. 1876.

Type locality: "From Alaska to Northern California, eastward to the Saskatchewan and Labrador, and southward in the mountains to Colorado and New Mexico."

Range: Alaska to Labrador, south to California and Texas.

Specimens examined: Fidalgo Island, *Lyall* in 1858; Rock Island, *Sandberg & Leiberg* 447; west Klickitat County, *Suksdorf* 1401, 604; Wilson Creek, *Lake & Hull* 650; Pullman, *Piper* 1548; Mount Carlton, *Kreager* 200.

Zonal distribution: Transition.

In the older botanical works our plant was usually referred to *R. domesticus* Hartm. It is probable, too, that the name *R. domesticus nanus* [a] also belongs to our species, in which case it has priority.

6. **Rumex salicifolius** Weinm. Flora **1821**: 28. 1821.

Type locality: "In California."

Range: British Columbia to Labrador, south to Florida and California.

Specimens examined: Orchard Point, *Piper*, July, 1895; Tacoma, *Flett* 93; west Klickitat County, *Suksdorf* 1402; Colville, *Lyall* in 1860; Crab and Wilson creeks, *Sandberg & Leiberg* 329; Wilson Creek, *Lake & Hull* 651; Tukanon River, *Lake & Hull* 651; Pullman, *Piper*, July 24, 1893.

Zonal distribution: Transition.

7. **Rumex crispus** L. Sp. Pl. **1**: 335. 1753. Yellow dock.

Type locality: Europe.

Specimens examined: Wenache, *Whited* 1252; Egbert Springs, *Sandberg & Leiberg* 400; Pullman, *Piper*, July, 1894.

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[a] Hook. Fl. Bor. Am. **2**: 129. 1838.

8. **Rumex conglomeratus** Murr. Prod. Fl. Goett. 52. 1770.

TYPE LOCALITY: None given, but European.

SPECIMENS EXAMINED: Whidby Island, *Gardner* 257; Seattle, *Piper* 627.

9. **Rumex persicarioides** L. Sp. Pl. 1: 335. 1753.

TYPE LOCALITY: "In Virginia."

RANGE: British Columbia to New Brunswick, southward to California, New Mexico, and Virginia.

SPECIMENS EXAMINED: Clallam County, *Elmer* 2684; Whidby Island, *Gardner* 256; Seattle, *Piper* 714; Silver Lake, *Henderson* 2423; Coulee City, *Henderson*, July 11, 1892; Ophir, *Elmer* in 1897; Alma, *Elmer*, 1897; Rock Lake, *Lake & Hull* 652; Alkali Lake, *Sandberg & Leiberg* 411; Southbend, *Spillman*, Aug. 17, 1899; without locality, *Cooper*; Mission, *Kreager* 484; Meyers Falls, *Kreager* 500.

ZONAL DISTRIBUTION: Transition.

10. **Rumex obtusifolius** L. Sp. Pl. 1: 335. 1753.

TYPE LOCALITY: "Habitat in Germania, Helvetia, Gallia, Anglia."

SPECIMENS EXAMINED: Seattle, *Piper* in 1888.

A common and troublesome weed in western Washington.

RUMEX ACETOSA L. is included in Suksdorf's list, but we have been unable to secure any evidence that it occurs in the State.

POLYGONUM.

- Stems twining; leaves cordate.
  - Outer calyx segments winged in fruit; akenes shining...... 1. *P. dumetorum*
  - Outer calyx segments not winged; akenes dull............. 2. *P. convolvulus*.
- Stems not twining; leaves not cordate.
  - Leaves small, usually narrow; stems wiry.
    - Blades of the leaves jointed on the pedicels.
      - Perennial with woody rootstocks; seashore plant.. 3. *P. paronychia*.
      - Annuals; roots fibrous.
        - Plants prostrate.
          - Akenes not longer than the calyx........ 4. *P. aviculare*.
          - Akenes protruding from the calyx....... 5. *P. fowleri*.
        - Plants erect or ascending.
          - Flowers in rather dense terminal bracteate spikes.
            - Bracts oblong, white-margined...... 6. *P. polygaloides*.
            - Bracts lanceolate, green.
              - Styles nearly obsolete; akenes brown, smooth.............. 7. *P. kelloggii*.
              - Styles evident; akenes black, striate...................... 8. *P. confertiflorum*.
          - Flowers axillary, or in loose or interrupted spikes.
            - Leaves rather broad, scarcely reduced upward.
              - Tall, branched throughout; style 3-cleft...................... 9. *P. erectum*.
              - Low alpine plant; style 3-parted. 10. *P. minimum*.
            - Leaves narrow, decidedly reduced upward.
              - Flowers in virgate, much elongated, loose spikes.

Fruiting pedicels erect.
Stout; akenes dull..... 11. *P. ramosissimum.*
Slender; akenes smooth, shining............. 12. *P. sawatchense.*
Fruiting pedicels reflexed.
Flowers campanulate, 2 to 3 mm. long...... 13. *P. douglasii.*
Flowers funnel-form, 3.5 to 4.5 mm. long.. 14. *P. majus.*
Flowers in interrupted, but rather close spikes.
Style 3-cleft; filaments slender.................... 15. *P. spergulariaeforme.*
Style 3-parted; filaments dilated................. 16. *P. nuttallii.*
Blades of the leaves not jointed on the pedicels.
Segments of the ocreae rigid...................... 17. *P. greenei.*
Segments of the ocreae not rigid................ 18. *P. parryi.*
Leaves comparatively large; flowers mainly terminal.
Perennials.
Styles 3; plants with thick roots.
Flowers in a single dense spike-like raceme; styles long.
Raceme thick not bulbiferous; akenes smooth.............................. 19. *P. bistortoides.*
Raceme slender, often bulbiferous; akenes dull.................................. 20. *P. viviparum.*
Flowers in racemes or panicles; styles short; alpine plants.
Racemes mainly axillary; leaves pubescent.................................. 21. *P. newberryi.*
Racemes panicled.
Leaves ovate; akene ovoid.......... 22. *P. phytolaccaefolium*
Leaves lanceolate; akene obovoid.... 23. *P. alpinum.*
Styles 2; aquatic or swamp plants with flowers in spike-like racemes.
Ocreae fringed at the spreading summit........ 24. *P. hartwrightii.*
Ocreae not fringed nor spreading.
Leaves oblong-elliptic, obtuse............ 25. *P. amphibium.*
Leaves ovate, acuminate................ 26. *P. emersum.*
Annuals; flowers in several spike-like racemes.
Styles 3-cleft; akenes 3-angled.................. 27. *P. hydropiperoides.*
Styles 2-cleft; akenes lenticular.
Ocreae naked; racemes drooping.
Akenes broad; style 2-cleft.............. 28. *P. lapathifolium.*
Akenes narrow; style 2-parted........... 29. *P. incarnatum.*
Ocreae bristly-ciliate.
Calyx not glandular; raceme dense....... 30. *P. persicaria.*
Calyx glandular; racemes interrupted.
Racemes erect...................... 31. *P. punctatum.*
Racemes drooping.................. 32. *P. hydropiper.*

1. **Polygonum dumetorum scandens** (L.) Gray, Man. ed. 5. 418. 1867.
Polygonum scandens L. Sp. Pl. **1**: 364. 1753.
TYPE LOCALITY: "Habitat in America."

Range: British Columbia to Nova Scotia, south to Texas and Florida.

Specimens examined: Near latitude 49°, *Lyall* in 1858. Perhaps the locality is east of Washington.

2. **Polygonum convolvulus** L. Sp. Pl. **1**: 364. 1753. Bindweed.

Type locality: Europe.

Specimens examined: North Yakima, *Watt*, August 1895; Lake Chelan, *Lake & Hull* 648; Pullman, *Piper* 1842; Almota, *Piper* 1815; Wawawai, *Piper*, July 31, 1893; Mount Carlton, *Kreager* 143.

3. **Polygonum paronychia** Cham. & Schlecht. Linnaea **3**: 51. 1828.

Type locality: "Ad portum S. Francisci Novae Californiae in arenosis littoralibus.

Range: Seashores, British Columbia to California.

Specimens examined: Clallam County, *Elmer* 2680; Shoalwater Bay, *Cooper;* Oyhut, *Lamb* 1256; Port Angeles, *Piper* 2304; Whidly Island, *Gardner* 263; Ocosta, *Henderson*, June 26, 1892.

Zonal distribution: Humid Transition.

4. **Polygonum aviculare** L. Sp. Pl. **1**: 362. 1753.

Type locality: Europe.

Specimens examined: Along Wilson Creek, *Lake & Hull* 644; Almota, *Piper* 2652, 1841; Pullman, *Piper* 1550.

5. **Polygonum fowleri** Robinson, Rhodora **4**: 67. 1902.

Type locality: New Brunswick.

Range: Seashores, New Brunswick to Virginia; British Columbia to Washington.

Specimens examined: Seattle, *Piper* 2861; Port Angeles, *Piper* 2305.

Zonal distribution: Humid Transition.

6. **Polygonum polygaloides** Meisn. in DC. Prod. **14**: 101. 1856.

Type locality: Clearwater River, Idaho. Collected by Spalding.

Range: Washington, Idaho, and Oregon.

Specimens examined: Rockford, *Watson* 341; Spokane, *Henderson* 2421; *Leiberg* 23; Spokane County, *Suksdorf* 431; Pullman, *Piper* 1551.

Zonal distribution: Arid Transition.

7. **Polygonum kelloggii** Greene, Fl. Fran. 134. 1891.

Polygonum imbricatum Nutt. Am. Nat. **7**: 665. 1873, not Raf. Fl. Tellur. **3**: 16. 1836.

Polygonum watsoni Small, Mon. Polyg. 138. 1895, as to synonymic type.

Type locality: "Frequent in the mountains, alpine and subalpine, from Colorado to Oregon and Northern California."

Range: Washington to California and Colorado.

Specimens examined: Mount Adams, *Henderson*, August 3, 1892; Mount Cleman, *Henderson* 2422; Mount Stuart, *Elmer* 1188; Falcon Valley, *Suksdorf* 608; Klickitat County, High Prairie, *Suksdorf* 2286; Skamania County, *Suksdorf* 897.

Zonal distribution: Canadian and Hudsonian.

8. **Polygonum confertiflorum** Nutt. in herb.

Polygonum watsoni Small, Mon. Polyg. 138. *pl. 56.* 1895, as to description and figure, but not as to synonymic type.

Type locality: Columbia Plains. Collected by Nuttall. Type in the Gray Herbarium.

Range: British Columbia to Saskatchewan, Colorado, and California.

Specimens examined: Klickitat River, *Flett* 1045; Falcon Valley, *Suksdorf* 478; Coulee City, *Piper* 3901, 3902, 3903; Douglas County, *Spillman;* Pullman, *Elmer* 1008; Major Creek, *Suksdorf* 2289; without locality, *Vasey* in 1883; Klickitat County, *Suksdorf* 2286, 2289; Colville to Spokane, *Wilkes Expedition.*

Zonal distribution: Arid Transition.

9. **Polygonum erectum** L. Sp. Pl. **1**: 363. 1753.

Type locality: "Habitat in Philadelphia."

Specimens examined: Yakima, *Piper*, July 9, 1897.

10. **Polygonum minimum** S. Wats. Bot. King. Explor. 315. 1871.

Type locality: "Wahsatch and Uinta Mountains; 9–11,000 feet altitude."

Range: Alaska to California and Utah.

Specimens examined: Olympics, *Piper* 1085; Mount Rainier, *Piper* 2122; Goat Mountains, *Allen* 264; Mount Adams, *Suksdorf* 605; *Howell* 421; east of Mount Adams, *Flett* 1047; Klickitat River, *Flett* 1042; Stevens Pass, *Sandberg & Leiberg* 799; Horseshoe Basin, *Elmer* 725; Blue Mountains, *Piper* 2436, 2421.

Zonal distribution: Arctic.

11. **Polygonum ramosissimum** Michx. Fl. **1**: 237. 1803.

Type locality: "In regione Illinoense."

Range: Washington to Saskatchewan, south to California and New Mexico; Maine to New Jersey near the coast.

Specimens examined: Falcon Valley, *Suksdorf* 475; Bingen, *Suksdorf* 1406; Yakima City, *Piper*, July 9, 1897; Kalispel Lake, *Kreager* 450.

Zonal distribution: Upper Sonoran and Arid Transition.

12. **Polygonum sawatchense** Small, Bull. Torr. Club **20**: 213. 1893.

Type locality: "on the Sawatch Range, Colorado."

Range: Washington to Dakota and Colorado.

Specimens examined: Falcon Valley, *Suksdorf*, July 19, 1886.

13. **Polygonum douglasii** Greene, Bull. Cal. Acad. **1**: 125. 1885.

Type locality: None cited.

Range: British Columbia to Vermont, south to California and Texas.

Specimens examined: Clallam County, *Elmer* 2683; Olympic Mountains, *Piper* 2239; *Flett*, July 21, 1897; Whidby Island, *Gardner* 260; Mount Rainier, *Piper* 2130; Lake Cushman, *Piper* 2240; Goat Mountains, *Allen* 263; Mount Adams, *Suksdorf* 607; Mason County, *Piper* 903; Wenache, *Whited*, June, 1896; Ellensburg, *Whited* 541, 542; Harrington, *Sandberg & Leiberg* 216; Charleston, *Piper* 2263; Blue Mountains, *Piper*, July 16, 1896; Pullman, *Piper* 1853.

Zonal distribution: Transition.

This species was formerly mistaken for *P. tenue* Michx. and references to it appear in the older works under that name.

13a. **Polygonum douglasii montanum** Small, Mon. Polyg. 118. 1895.

Polygonum tenue latifolium Engelm.; Gray, Proc. Acad. Phila. **1863**: 75. 1864, not *P. aviculare latifolium* Michx. 1803.

Polygonum douglasii latifolium Greene, Bull. Cal. Acad. **1**: 125. 1885.

Type locality: Colorado.

Range: Washington to California and Arizona.

Specimens examined: Blue Mountains, *Horner* 426, 427.

14. **Polygonum majus** (Meisn.) Piper, Fl. Palouse Reg. 63. 1901.

Polygonum coarctatum majus Meisn. in DC. Prod. **14**: 101. 1856.

Type locality: "Ad flum. Columbia (Dougl.!) in mont. Scopulosis (Geyer n. 355!)." The Geyer plant is really from the Kooskoosky River, Idaho.

Range: Washington, Oregon, and Idaho.

Specimens examined: White Salmon, *Suksdorf;* Wenache, *Whited* 1298, 1127; Ellensburg, *Elmer* 386; North Yakima, *Steinweg* in 1894; Rock Island, *Sandberg & Leiberg* 434; west Klickitat County, *Suksdorf* 212; Pasco, *Hindshaw* 31; Loon Lake, *Winston*, July 20, 1897; Spokane River, *Henderson*, June 1, 1892; Spangle, *Suksdorf* 1409; Pullman, *Lake & Hull* 647; without locality, *Vasey* in 1889; Chelan, *Griffiths & Cotton* 160.

Zonal distribution: Arid Transition.

15. Polygonum spergulariaeforme Meisn.; Small, Bull. Torr. Club **19**: 366. 1892.

Polygonum coarctatum Dougl.; Hook. Fl. Bor. Am. **2**: 133. 1838, not Willd. 1825.

Polygonum lineare Menzies; Hook. Fl. Bor. Am. **2**: 133. 1838, as synonym.

Type locality: "N. W. America." Collected by Menzies.

Range: British Columbia to Oregon in the coast region.

Specimens examined: Bellingham Bay, *Suksdorf* 2047; Fidalgo Island, *Flett* 2125; Seattle, *Piper & Smith* in 1888; Tacoma *Flett*; De Fuca, *Dr. Scouler;* Rockland, *Howell*.

Zonal distribution: Humid Transition.

16. Polygonum nuttallii Small, Mon. Polyg. 132. *pl. 53*, 1895.

Polygonum intermedium Nutt.; S. Wats. Proc. Am. Acad. **17**: 378. 1882, not Ehrh. 1791.

Type locality: "On bluffs of the Columbia plains." Collected by Nuttall.

Range: Washington and Oregon.

Specimens examined: Olympic Mountains, *Henderson* 2420; Lake Cushman, *Piper* 2241; Mount Constitution, *Henderson* 2419; Evergreen, *Conard* 424; Stehekin, *Gorman* 737.

Zonal distribution: Canadian.

17. Polygonum greenei S. Wats. Proc. Am. Acad. **14**: 295. 1879.

Type locality: "Plains of Shasta," and "near Chico." Collected by Greene and by Mrs. Bidwell.

Range: Washington to California.

Specimens examined: West Klickitat County, *Suksdorf* 1002.

18. Polygonum parryi Greene, Bull. Torr. Club **8**: 99. 1881.

Type locality: Yosemite Valley, California. Collected by Parry.

Range: Washington to California.

Specimens examined: Falcon Valley, *Suksdorf* 609, 1410.

19. Polygonum bistortoides Pursh, Fl. **1**: 271. 1814.

Polygonum bistorta oblongifolium Meisn. in DC. Prod. **14**: 126. 1856.

Polygonum glastifolium Greene, Pittonia **5**: 199. 1903.

Type locality: "In low grounds on the banks of the Missouri, called Quamash-flats." Collected by Lewis. The date and locality on original label show the place to be what is now Weippe, Idaho.

Range: Subarctic regions, south to California and Arizona.

Specimens examined: Clallam County, *Elmer* 2681; Mount Rainier, *Piper*, August 15, 1895; *Allen* 42; Silverton, *Bouck* 195; Klickitat River, *Flett* 1043; Stevens Pass, *Sandberg & Leiberg* 748; Falcon Valley, *Suksdorf* 1413; Ellensburg, *Whited* 728; Horseshoe Basin, *Elmer* 740; *Lake & Hull* 649; 6 miles east of Pullman, *Lake & Hull*, May 20, 1892; without locality, *Vasey* in 1889; Vancouver, *Piper* 4934.

Zonal distribution: Arid Transition as to the typical plant, but recurring in the Arctic-Alpine meadows.

20. Polygonum viviparum L. Sp. Pl. **1**: 360. 1753.

Type locality: Europe.

Range: Alaska to Greenland, south to New England and Colorado. Europe, Asia.

Specimens examined: Cascade Mountains, latitude 49°, *Lyall* in 1860.

Zonal distribution: Arctic.

21. Polygonum newberryi Small, Bull. Torr. Club **21**: 170. 1894.

Type locality: Cascade Mountains of Oregon at Crater Pass.

Range: Washington and Oregon.

SPECIMENS EXAMINED: Mount Rainier, *Flett* 305; *Piper* 2112; Mount Stuart, *Elmer* 1232, *Brandegee* 1066; Goat Mountain, *Allen* 127; Mount Adams, *Henderson*, August 9, 1892; *Suksdorf*, September, 1877; *Flett* 1044.

ZONAL DISTRIBUTION: Arctic.

This species was formerly confused with the more southern *P. davisiae* Brewer, and appears under that name in Suksdorf's list.

22. **Polygonum phytolaccaefolium** Meisn.; Small, Bull. Torr. Club **19**: 360. 1892.

TYPE LOCALITY: California.

RANGE: Washington and Idaho to California.

SPECIMENS EXAMINED: Mount Adams, *Suksdorf* 85; 10 miles north of Mount Adams, *Flett* 1053.

ZONAL DISTRIBUTION: Hudsonian and Arctic.

23. **Polygonum alpinum foliosum** (Keller) Small, Bull. Torr. Club **19**: 360. 1892.

Polygonum polymorphum foliosum Keller, Bull. Soc. Bot. Belg. **30**: 49. 1891.

TYPE LOCALITY: Mount Adams, Washington.

RANGE: Washington.

SPECIMENS EXAMINED: Mount Adams, *Suksdorf* 610 in 1885; *Howell & Henderson* in 1882.

24. **Polygonum hartwrightii** A. Gray, Proc. Am. Acad. **8**: 294. 1870.

TYPE LOCALITY: "Sedgy bogs, New York from Herkimer to Yates County, and Michigan."

RANGE: British Columbia and Saskatchewan, south to California, Kansas, and Maine.

SPECIMENS EXAMINED: White Salmon, *Suksdorf* 482; Coupeville, *Gardner* 254; Seattle, *Piper* 720; *Smith*, July 11, 1889; Spokane, *Dewart*, June 6, 1901; Davis Lake, *Kreager* 438.

ZONAL DISTRIBUTION: Transition.

25. **Polygonum amphibium** L. Sp. Pl. **1**: 361. 1753.

TYPE LOCALITY: Europe.

RANGE: Alaska to Quebec, south to California, Colorado, and Pennsylvania. Europe, Asia.

SPECIMENS EXAMINED: Seattle, *Piper*, August, 1892; Lake City, *Flett* 170; Lake Washington, *Piper*, August, 1892; Wenache Mountains, *Elmer* 432; Lake Conconully, *Whited* 1316; Pend Oreille River, *Lyall* in 1861; 6 miles east of Pullman, *Piper*, July 7, 1899; Lake Kalispel, *Kreager* 338.

ZONAL DISTRIBUTION: Transition.

26. **Polygonum emersum** (Michx.) Britton, Trans. N. Y. Acad. Sci. **8**: 73. 1889.

Polygonum amphibium emersum Michx. Fl. **1**: 240. 1803.

Polygonum muhlenbergii Wats. Proc. Am. Acad. **14**: 295. 1879.

Polygonum amphibium terrestre Torr. Fl. U. S. **1**: 403. 1824.

TYPE LOCALITY: "Ad ripas fluminis Ohio."

RANGE: British Columbia to New England, southward to Mexico, Louisiana, and Virginia.

SPECIMENS EXAMINED: Western Washington, latitude 49°, *Lyall* in 1858; Coulee City, *Lake & Hull* 645; Rock Lake, *Lake*, August 3, 1893; Chelan, *Elmer* 857; junction Crab and Wilson creeks, *Sandberg & Leiberg* 328; Union Flat, *Lake & Hull* 646; Pullman, *Piper* 1829; Uniontown, *Henderson* 2699; Prosser, *Cotton* 812.

ZONAL DISTRIBUTION: Arid Transition.

Prof. E. L. Greene considers the *Polygonum emersum* as generally understood to be an aggregate of many species. Among these Elmer's 857 is made the type of *Persicaria chelanica* Greene.[a] Some other segregates of this and related species, namely, *Persicaria cusickii* Greene[b] and *Persicaria oregana* Greene[c] occur in Washington and adjoining States. This group of species should receive much careful field study.

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[a] Leaflets 1: 49. 1904.

[b] Op. cit. 42.

[c] Op. cit. 31.

27. Polygonum hydropiperoides Michx. Fl. 1: 239. 1803.

TYPE LOCALITY: "In Pennsylvania, Virginia, Carolina."

RANGE: Washington to New Brunswick, south to Mexico and Florida.

SPECIMENS EXAMINED: West Klickitat County, *Suksdorf* 668, 56, 483.

28. Polygonum lapathifolium L. Sp. Pl. 1: 360. 1753.

Polygonum nodosum Pers. Syn. 1: 440. 1805.

TYPE LOCALITY: "Habitat in Gallia."

SPECIMENS EXAMINED: Latitude 49°, *Lyall* in 1858; Southbend, *Spillman;* Alma, *Elmer* 540; Methow River, *Whited* 11, 213; Ellensburg, *Whited* 596; North Yakima, *Watt*, August, 1895; White Salmon, *Suksdorf;* Squaw Creek, *Cotton* 870.

28a. Polygonum lapathifolium incanum (Schmidt) Koch, Syn. Fl. Germ. 617. 1837.

Polygonum incanum Schmidt, Fl. Boem. 4: 90. 1795.

TYPE LOCALITY: Not ascertained.

RANGE: British Columbia and Washington to Nova Scotia and New York, probably introduced.

SPECIMENS EXAMINED: Usk, *Kreager* 360; Wawawai, *Piper*, August 24, 1894.

29. Polygonum incarnatum Ell. Bot. S. C. and Ga. 1: 456. 1817.

TYPE LOCALITY: None given, but South Carolina and Georgia understood.

RANGE: Vermont to Nebraska, south to Louisiana and Florida.

SPECIMENS EXAMINED: Egbert Springs, *Sandberg & Leiberg* 406; Wawawai, *Piper*, August 23, 1899.

The above specimens are in all probability introduced.

30. Polygonum persicaria L. Sp. Pl. 1: 361. 1753.

TYPE LOCALITY: European.

SPECIMENS EXAMINED: Seattle, *Savage* 47; Puyallup, *Piper* 2364; Tacoma, *Flett* 126; Almota, *Piper* 2362.

31. Polygonum punctatum Ell. Bot. S. C. & Ga. 1: 455. 1817.

Polygonum acre H. B. K. Nov. Gen. 2: 179. 1817, not Lam. 1805.

TYPE LOCALITY: South Carolina and Georgia.

RANGE: Temperate North America.

SPECIMENS EXAMINED: White Salmon, *Suksdorf* 484; North Yakima, *Piper* 1820; Lindsleys Ranch, Clarke County, *Henderson*, September 6, 1892.

31a. Polygonum punctatum leptostachyum (Meisn.) Small, Bull. Torr. Club 19: 356. 1892.

Polygonum acre leptostachyum Meisn. in DC. Prod. 14: 108. 1856.

TYPE LOCALITY. "In Amer. boreale et australi, praecipue tropica."

RANGE: The whole United States and southward.

SPECIMENS EXAMINED: Latitude 49°, *Lyall* in 1858-59; west Klickitat County, *Suksdorf* 1412.

32. Polygonum hydropiper L. Sp. Pl. 1: 361. 1753.

TYPE LOCALITY: European.

SPECIMENS EXAMINED: Puyallup, *Piper* 2320.

POLYGONUM PENNSYLVANICUM L. appears on Suksdorf's list, credited to Klickitat County. We have seen no Washington specimens.

PTEROSTEGIA DRYMARIOIDES Fisch. & Mey. Ind. Sem. Hort. Petrop. 2: 23. 1835. Type locality, "In portu Bodega Novae Californiae." Included by Suksdorf in his list, but he writes that he has seen no Washington specimens. A specimen in the Gray Herbarium is labeled "Columbia, Tolmie."

ERIOGONUM.

- Flowers not stipe-like at base.
  - Involucre nerveless; branches leafy; annual .... 1. *E. angulosum.*
  - Involucre distinctly nerved.
    - Outer perianth segments much broader than the inner.
      - Umbel simple, close; plants densely cespitose.
        - Involucre campanulate; flowers 3 to 4 mm. long, white or yellow .... 2. *E. ovalifolium.*
        - Involucre turbinate; flowers 4.5 to 5.5 mm. long, wine red .... 3. *E. vineum.*
      - Umbel compound; plants loosely cespitose.
        - Involucres in clusters; flowers white, yellow, or purple .... 4. *E. proliferum.*
        - Involucres scattered, mostly solitary; flowers white.
          - Plants erect or ascending .... 5. *E. niveum.*
          - Plant decumbent .... 6. *E. decumbens.*
    - Outer perianth segments like the inner.
      - Shrub, much branched; leaves linear to oblanceolate .... 7. *E. microthecum.*
      - Herbs.
        - Annuals; stems wiry; leaves rosulate.
          - Involucre 3 mm. long .... 11. *E. vimineum.*
          - Involucre 1 to 1.5 mm. long .... 12. *E. baileyi.*
        - Perennials.
          - Plants very dwarf and very leafy; peduncles bearing a single involucre.... 13. *E. minimum.*
          - Plants tall, not very leafy; peduncles bearing more than one involucre.
            - Peduncles stout, fistulous; involucres 3 to 6 in each cluster.
              - Leaves ovate-oblong, acute, 5 to 15 cm. long .... 8. *E. elatum.*
              - Leaves oblong or ovate, obtuse, 1 to 5 cm. long .... 9. *E. nudum.*
            - Peduncles slender, not fistulous; involucres scattered in a loose cyme .... 10. *E. strictum.*
- Flowers attenuate and stipe-like at base.
  - Perianth pubescent.
    - Involucre with reflexed lobes.
      - Prostrate or nearly so, only the flowering stems upright; flowers cream color; leaves oblong or spatulate, not revolute .... 14. *E. douglasii.*
      - Erect, much branched; flowers bright yellow; leaves linear or linear-spatulate, often revolute. 15. *E. sphaerocephalum.*
    - Involucre with erect lobes or teeth.
      - Shrubby; leaves linear, revolute .... 16. *E. thymoides.*
      - Herbaceous; leaves oblong or obovate, not revolute.
        - Flowers yellow; bracts 3 to 8 .... 17. *E. piperi.*
        - Flowers purplish; bracts 2 .... 18. *E. pyrolaefolium.*
  - Perianth glabrous.

Leaves large, 2 to 8 cm. long, oblong-ovate, mostly cordate; peduncles stout, naked .... 19. *E. compositum.*
Leaves smaller, never cordate; peduncles not naked.
Leaves narrow, tomentose on both sides .... 20. *E. heracleoides.*
Leaves broader, glabrous or glabrate above.
Inflorescence a single involucre .... 21. *E. tolmieanum.*
Inflorescence umbellate.
Umbel simple.
Flowers yellow .... 22. *E. umbellatum.*
Flowers cream-color .... 22b. *E. umbellatum majus.*
Umbel compound .... 23. *E. stellatum.*

1. **Eriogonum angulosum** Benth. Trans. Linn Soc. **17**: 406. 1837.

Type locality: California.

Range: Washington to California and Arizona.

Specimens examined: Morgans Ferry, *Suksdorf* 438; Yakima region, *Brandegee* 1051.

Zonal distribution: Upper Sonoran.

2. **Eriogonum ovalifolium** Nutt. Journ. Acad. Phila. **7**: 50. 1834.

Type locality: "Sources of the Missouri." Collected by Wyeth.

Range: British Columbia to California and Colorado.

Specimens examined: Mount Rainier, *Smith* 773; Mount Adams, *Suksdorf* 87; *Flett* 1051; Mount Stuart, *Sandberg & Leiberg* 827; Olympic Mountains, *Elmer* 2682.

Zonal distribution: Arctic.

3. **Eriogonum vineum** Small, Bull. Torr. Club **25**: 45. 1898.

? *Eucycla purpurea* Nutt. Journ. Acad. Phila. II. **1**: 166. 1847.

? *Eriogonum purpureum* Nutt.; Benth. in DC. Prod. **14**: 10. 1856.

Type locality: "California, near Rose mine, San Bernardino Mountains, altitude 2,100 meters."

Range: Washington to California.

Specimens examined: Olympics, *Flett* 127; Mount Adams, *Henderson*, August 10, 1892; Mount Stuart, *Elmer* 1221.

Zonal distribution: Arctic.

4. **Eriogonum proliferum** Torr. & Gr. Proc. Am. Acad. **8**: 164. 1873.

? *Eriogonum oblongifolium minus* Benth. in DC. Prod. **14**: 113. 1856.

Type locality: "Idaho Mountains (Prof. O. Marcy, Prof. Swallow) to N. Fork of the Columbia, Wilkes Expedition, Weenas Valley and Walla Walla, Lyall."

Range: Washington and Idaho to California.

Specimens examined: Ellensburg, *Whited* 537, 658, 668; *Elmer* 382, 1087, 391; *Piper* 2719; Wenache, *Whited* 147, 1245, 1169; Satus, *Elmer* 1072; Pasco, *Hindshaw* 36, 14; *Piper* 2956; Mount Cleman, *Henderson*; Peshastin, *Sandberg & Leiberg* 493; Snipes Mountain, *Cotton* 386; North Yakima, *Henderson* 2426; *Flett* 1056; *Watt*; *Steinweg*; *Leckenby*; without locality, *Henderson* 2428; Goldendale, *Suksdorf* 440; Rattlesnake Mountains, *Suksdorf* 439; Morgans Ferry, *Suksdorf* 441; Wenas Valley and Walla Walla, *Lyall* in 1860; without locality, *Vasey* 145; between Spipen River and North Fork of the Columbia, *Wilkes Expedition*.

Zonal distribution: Upper Sonoran.

Apparently all the Washington specimens that have been referred to *E. oblongifolium* belong to *E. proliferum*.

5. **Eriogonum niveum** Dougl.; Benth. Trans. Linn. Soc. **17**: 414. 1837.

Eriogomum dichotomum Dougl.; Benth. op. cit. 415.

Type locality: "Valleys of the Blue Mountains." Collected by Douglas.

Range: British Columbia to Idaho and California.

Specimens examined: Wenache, *Whited* 723, 1157; Similkameen Valley, *Lyall* in 1860; Lake Chelan, *Lake & Hull* 673; Coulee City, *Henderson* 2427; Loomis, *Elmer* 605; Alkali Lake, *Sandberg & Leiberg* 419; Clarks Springs, *Kreager* 123; without locality, *Cooper* in 1853; Spokane, *Sandberg; Piper* 2811 *Suksdorf* 945; *Watson* 349; *Sandberg, Heller & MacDougal* 903; Wawawai, *Piper* 1634, 1547; Waitsburg, *Horner* 433; Marcus, *Kreager* 463.

Zonal distribution: Upper Sonoran.

We have been quite unable to distinguish two species, as did Douglas, based on differences in degree of development of the bracts, and on the erect or spreading position of the calyx teeth.

6. **Eriogonum decumbens** Benth. Trans. Linn. Soc. **17**: 415. 1837.

Eriogonum niveum decumbens Torr. & Gr. Proc. Am. Acad. **8**: 174. 1870.

Type locality: "Columbia River." Collected by Douglas.

Range: Washington and Oregon.

Specimens examined: Klickitat County, *Leckenby;* Sunnyside, *Piper;* without locality, *Douglas.*

Zonal distribution: Upper Sonoran.

This plant is perhaps only a subspecies of *E. niveum*, but its habit is quite distinct. It is confined to sand hills where it forms large decumbent masses often 50 cm. in diameter. The leaves also are broader than in *E. niveum.*

7. **Eriogonum microthecum** Nutt. Journ. Acad. Phila. II. **1**: 162. 1847.

Type locality: "On the sides of hills in Oregon, east of Walla Walla." Collected by Nuttall.

Range: Washington to California, New Mexico, and Nebraska.

Specimens examined: Ellensburg, *Whited* 553; Egbert Springs, *Sandberg & Leiberg*, July, 1893; Tampico, *Henderson*, July 31, 1892; Moses Lake, *Sandberg & Leiberg*, July, 1893; Parker, *Elmer* 1078; North Yakima, *Piper* 1879; *Henderson*, October 5, 1892; *Watt*, August, 1895; without locality, *Cooper;* without locality, *Vasey* in 1889; Kiona, *Cotton* 734.

Zonal distribution: Upper Sonoran.

We have seen no Washington specimens referable to *E. corymbosum* Nutt. and believe that such references really apply to *E. microthecum.*

8. **Eriogonum elatum** Dougl.; Benth. Trans. Linn. Soc. **17**: 413. 1837.

Type locality: "Columbia River." Collected by Douglas.

Range: Washington to California and Nevada.

Specimens examined: Wenache, *Whited*, August, 1896; Ellensburg, *Elmer* 387; *Whited* 276; *Piper*, July, 1897; White Bluff Ferry, *Lake & Hull* 677; North Yakima, *Watt*, August, 1895; *Steinweg* in 1894; Peshastin, *Sandberg & Leiberg*, August, 1893; Rock Island, *Sandberg & Leiberg* 424; near Chelan River, *Watson* 347; Columbia Valley, *Lyall* in 1860; Tahlk Plain, *Cooper;* without locality, *Vasey* in 1889; Umtanum Creek, *Cotton* 820.

Zonal distribution: Upper Sonoran.

9. **Eriogonum nudum** Dougl.; Benth. Trans. Linn. Soc. **17**: 413. 1837.

Type locality: "Plains of the Multnomah," Oregon. Collected by Douglas.

Range: Washington to California.

Specimens examined: North of Mount Adams, *Henderson* 2429.

Zonal distribution: Arid Transition.

10. **Eriogonum strictum** Benth. Trans. Linn. Soc. **17**: 414. 1837.

Type locality: "Columbia River." Collected by Douglas. The original label gives the locality "Blue Mountains."

Range: Blue Mountains of Washington and Oregon.

Specimens examined: Along Salmon River, *Horner* 432.

11. **Eriogonum vimineum** Dougl.; Benth. Trans. Linn. Soc. **17**: 416. 1837.

Type locality: "Columbia River." Collected by Douglas.

Range: Washington and Idaho to California and Nevada.

Specimens examined: Wenache, *Whited* 1156; Ellensburg, *Whited* 665; North Yakima *Watt*, August, 1895; Pasco, *Elmer* 1057; *Piper*, July 11, 1897; Waitsburg, *Horner* 584; Wawawai, *Piper* 1546; without locality, *Vasey* in 1889; Prosser, *Cotton* 807.

Zonal distribution: Upper Sonoran.

12. **Eriogonum baileyi** S. Wats. Proc. Am. Acad. **10**: 348. 1875.

Type locality: Northwestern Nevada. Collected by W. W. Bailey.

Range: Washington to Arizona and Utah.

Specimens examined: Yakima, *Howell* in 1877; *Vasey* 147.

Zonal distribution: Upper Sonoran.

13. **Eriogonum minimum** Small, Bull. Torr. Club **25**: 47. 1898.

Type locality: Cascade Mountains, Washington. Collected by Brandegee, probably on Mount Stuart.

Range: Known only by the type specimen.

Specimens examined: Cascade Mountains, *Brandegee* 372.

14. **Eriogonum douglasii** Benth. in DC. Prod. **14**: 9. 1856.

Type locality: "In montibus Coeruleis. Gairdner! Douglas!"

Range: Washington to California.

Specimens examined: Wenache Mountains, *Elmer* 461: *Whited* 101; Ellensburg, *Whited* 355, 642, 100; *Piper* 2706; North Yakima, *Steinweg* in 1894; Tampico, *Flett* 1051; mountains between Ellensburg and Wenache, *Whited* 725; without locality, *Vasey* in 1889; Wenache Mountains, *Griffiths & Cotton* 118; *Cotton* 1297.

Zonal distribution: Arid Transition.

14a. **Eriogonum douglasii ramosum** subsp. nov.

Differs from the typical form in that the umbel is compound.

Foothills east of Ellensburg, *Whited* 643.

15. **Eriogonum sphaerocephalum** Dougl; Benth. Trans. Linn. Soc. **17**: 407. 1837.

Type locality: "Columbia River." Collected by Douglas.

Range: Eastern Washington to California and Nevada.

Specimens examined: Ellensburg, *Elmer* 1083; Wenache, *Whited* 724, 1278; Yakima River, *Wilkes Expedition* 936; Tampico, *Flett* 1054; Simcoe Valley, *Lyall* in 1860; Crab Creek, *Suksdorf* 435; Wilson and Crab creeks, *Sandberg & Leiberg* 319; without locality, *Douglas;* Coulee City, *Piper* 3842; Rattlesnake Mountains, *Cotton* 704; Umtanum Creek, *Cotton* 814.

Zonal distribution: Upper Sonoran.

15a. **Eriogonum sphaerocephalum tenue** (Small).

Eriogonum tenue Small, Bull. Torr. Club **25**: 41. 1898.

Type locality: West Klickitat County, Washington. Collected by Suksdorf.

Range: Eastern Washington and perhaps eastern Oregon.

Specimens examined: West Klickitat County, *Suksdorf* 433, 307, 434, 694; eastern Washington, *Hilgard* in 1882; Coulee City, *Henderson*, July 11, 1892; Wilson Creek, *Lake & Hull* 672.

Zonal distribution: Upper Sonoran.

16. **Eriogonum thymoides** Benth. in DC. Prod. **14**: 9. 1856-7.

Type locality: "Ad fl. Spokan in regione Oregon superioris." Collected by the Wilkes Expedition.

Range: Washington and Oregon.

Specimens examined: Wenache, *Whited* 76, 33, 1091; Ellensburg, *Whited* 648; *Piper* 2710; North Yakima, *Henderson*, May 2 and 26, 1892; *Steinweg* in 1894; Rattlesnake Mountains, *Cotton* 361, 362; Pasco, *Hindshaw* 10; Bickleton, *Suksdorf* 432; Goldendale, *Henderson* in 1882; Simcoe Hills, *Lyall* in 1860; Coulee City, *Piper* 3868; Douglas County, *Spillman*, May 26, 1896; near mouth of Swauk, *Watson* 348; Ritzville, *Sandberg & Leiberg* 167; Prosser, *Cotton* 59.

Zonal distribution: Upper Sonoran.

17. **Eriogonum piperi** Greene, Pittonia **3**: 263. 1898.

Type locality: Blue Mountains, Columbia County, Washington.

Range: Washington to Montana.

Specimens examined: Blue Mountains, *Piper* 2453.

Zonal distribution: Hudsonian.

18. **Eriogonum pyrolaefolium coryphaeum** Torr. & Gr. Proc. Am. Acad. **8**: 162 1870.

Type locality: "Summit of the Cascade Mountains, about lat. 49° on the east side at the height of 7,500 feet." Collected by Lyall.

Range: Washington and Oregon.

Specimens examined: Mount Rainier, *Allen* 206; *Piper* 2117; *Piper & Smith* 541; Mount Adams, *Henderson*, August 9, 1892; Paradise Valley, *Flett* 261; Mount Adams, *Suksdorf* 86; *Flett* 1050; *Howell & Henderson* in 1882; Skamania County, *Suksdorf* 1419; Cascade Mountains, *Tweedy*, August, 1882; Cascade Mountains, *Lyall* in 1860.

Zonal distribution: Arctic.

19. **Eriogonum compositum** Dougl.; Benth. Trans. Linn. Soc. **17**: 410. 1837.

Type locality: "Columbia River." Collected by Douglas.

Range: Washington and Idaho to California.

Specimens examined: Wenache, *Whited* 1149; Mount Rainier, *Piper* 2127; *Flett* 230; Goat Mountain, *Allen*, September 20, 1893; Mount Stuart, *Brandegee* 1050; Klickitat County, *Suksdorf* 47, 437; Columbia Valley, *Lyall* in 1860; Vancouver, *Nuttall;* Columbia River, *Douglas;* banks of Columbia opposite Wenache, *Watson* 351; without locality, *Brandegee* 1048; Rock Island, *Whited* 1415; Ellensburg, *Whited* 560; North Yakima, *Steinweg* in 1894; Spokane, *Leiberg* 22; without locality, *Vasey* in 1889; Clarks Springs, *Kreager* 94.

Zonal distribution: Upper Sonoran.

19a. **Eriogonum compositum leianthum** Benth. in DC. Prod. **14**: 12. 1856.

Type locality: "In regione Oregon superioris ad Clear Water (Spalding) ad fl. Spokan et Kooskoosky (Geyer n. 470)."

Range: Washington, Oregon, and Idaho.

Specimens examined: Wenache, *Whited*, May 13, 1900, and 92; North Yakima, *Steinweg* in 1894; mountains between Ellensburg and Wenache, *Whited* 726; Crab and Wilson creeks, *Sandberg & Leiberg* 289; Wawawai, *Piper* 1883; *Elmer* 773; mouth of Methow River, *Watson* 350; without locality, *Vasey* in 1889; Spokane, *Henderson*, June, 1892; without locality, *Cooper* in 1853; North Yakima, *Griffiths & Cotton*, June 1, 1902.

Zonal distribution: Upper Sonoran.

This is distinguished from typical *E. compositum* by having a smooth perianth.

20. **Eriogonum heracleoides** Nutt. Journ. Acad. Phila. **7**: 49. 1834.

Eriogonum heracleoides minus Benth. in DC. Prod. **14**: 11. 1856.

Type locality: "Sources of the Missouri." Collected by Wyeth.

Range: British Columbia to Nevada and Utah.

Specimens examined: Ellensburg, *Elmer* 389; *Whited* 537½; Wenache, *Whited* 122, 1090, and June, 1896; North Yakima, *Steinweg* in 1894; *Flett* 1057; Conconully, *Whited* 1314; Rattlesnake Mountains, *Cotton* 404; Douglas County, *Spillman*, May 27, 1896; Wilson Creek, *Sandberg & Leiberg* 268; Columbia interior, *Douglas* in 1826; Sprague, *Lake & Hull* 675; *Henderson*, May 30, 1892; Spokane County, *Suksdorf* 436 in part; Cheney, *Tucker* in 1892; Cow Creek, *Lyall* in 1860; without locality, *Vasey* in 1889; Spokane, *Dewart*, June 5, 1901; Pullman, *Piper* 1545; *Lake & Hull* 676; Blue Mountains, *Piper*, August, 1896; Spokane, *Kreager* 11; 2 days before Fort Okanogan, *Wilkes Expedition*.

ZONAL DISTRIBUTION: Arid Transition.

A form of this from the region of Mount Stuart, represented by Elmer's 1096, Brandegee's 1050, and Sandberg & Leiberg's 813, is distinguished by having small compact umbels and rather narrow lanceolate or lance-ovate leaves. It perhaps merits recognition as a subspecies.

Another form of the species, which includes Watson's 351, Whited's 1149 and 1415, and Brandegee's 1048, is characterized by unusually small and broad leaves, 2 to 4 cm. long, and small compact umbels of smaller flowers. Doctor Watson has labeled his specimen variety *simplex*, under which name the plant may be known.

20a. Eriogonum heracleoides angustifolium (Nutt.) Torr. & Gr. Proc. Am. Acad. **8**: 159. 1870.

Eriogonum angustifolium Nutt. Journ. Acad. Phila. II. **1**: 164. 1847.

TYPE LOCALITY: "Western slope of the Rocky Mountains." Collected by Nuttall.

RANGE: Washington, Oregon, Idaho.

SPECIMENS EXAMINED: Bickleton, *Suksdorf* 436.

21. Eriogonum tolmieanum Hook. Fl. Bor. Am. **2**: 134. 1838.

Eriogonum umbellatum monocephalum Torr. & Gr. Proc. Am. Acad. **8**: 160. 1870.

TYPE LOCALITY: "Banks of the Walla Walla River, among Artemisia." Collected by Tolmie.

RANGE: Washington to California?

SPECIMENS EXAMINED: Walla Walla River, *Tolmie;* Yakima region, *Tweedy*, October, 1882.

22. Eriogonum umbellatum Torr. Ann. Lyc. N. Y. **2**: 241. 1828.

Eriogonum latum Small; Rydberg, Mem. N. Y. Bot. Gard. **1**: 121. 1900.

TYPE LOCALITY: "Near the Rocky Mountains." Collected by James.

RANGE: Washington and Montana to California and Colorado.

SPECIMENS EXAMINED: Stehekin, *Whited* 1383; Wenache Mountains, *Whited* 1167; Tumwater Canyon, *Sandberg & Leiberg* 521; Mount Adams, *Flett* 1049; *Henderson*, August 9, 1892; Big Klickitat River, *Cotton* 1476.

ZONAL DISTRIBUTION: Hudsonian.

22a. Eriogonum umbellatum hypoleium subsp. nov.

Leaves green on both sides, sparingly pubescent on the margins and petioles.

SPECIMENS EXAMINED: Wenache Mountains, *Whited* 727, July 17, 1898 (type, deposited in the United States National Herbarium); Mount Stuart, *Elmer* 1192, August, 1898.

22b. Eriogonum umbellatum majus Benth. in DC. Prod. **14**: 11. 1856.

Eriogonum subalpinum Greene, Pittonia **3**: 18. 1896.

TYPE LOCALITY: "In montibus scopulosis region. sup. fl. Platte, Sweetwater, etc. (Gordon, Fremont, Burke, Geyer)."

RANGE: Washington to Montana and Colorado.

SPECIMENS EXAMINED: Cascade Mountains, latitude 49°, *Lyall;* Mount Stuart, *Elmer* 1193; Mount Chapaca, *Elmer* 586; Yakima region, *Tweedy*, August, 1882; Nason Creek *Sandberg & Leiberg* 686; without locality, *Vasey* in 1889; Mount Carlton, *Kreager* 236.

23. Eriogonum stellatum Benth. Trans. Linn. Soc. **17**: 409. 1837.

Eriogonum croceum Small, Bull. Torr. Club **25**: 43. 1898.

TYPE LOCALITY: "Interior of northwest America." Collected by Douglas.

SPECIMENS EXAMINED: Blue Mountains, *Piper* 2447.

ZONAL DISTRIBUTION: Arid Transition.

OXYTHECA.

1. **Oxytheca dendroides** Nutt. Journ. Acad. Phila. II. 1: 169. 1847.

Type locality: "On the sand hills of the Rocky Mountains, near Lewis River." Collected by Nutall.

Range: Washington to Wyoming and Nevada.

Specimens examined: Sunnyside, *Piper* 2847; Pasco, *Elmer* 1053; Morgans Ferry, *Suksdorf* 444; Egbert Springs, *Sandberg & Leiberg* 380; Priest Rapids, *Brandegee* 1061; junction of Crab and Wilson creeks, *Sandberg & Leiberg* 302.

Zonal distribution: Upper Sonoran.

CHORIZANTHE.

1. **Chorizanthe watsoni** Torr. & Gr. Proc. Am. Acad. 8: 199. 1873.

Type locality: "Nevada, on the borders of the desert, Humboldt, Reese River, and Grass valleys."

Range: East Washington to Nevada and California.

Specimens examined: Morgans Ferry, *Suksdorf* 445; Yakima, *Leckenby*, June, 1898; North Yakima, *Henderson* 2424; Pasco, *Piper* 2960; junction of Crab and Wilson creeks, *Sandberg & Leiberg* 258; without locality, *Brandegee* 445; Coulee City, *Piper* 3876.

Zonal distribution: Upper Sonoran.

CHENOPODIACEAE. Goosefoot Family.

- Embryo spirally coiled; endosperm scanty or wanting.
  - Shrub with monoecious flowers .... Sarcobatus (p. 239).
  - Herbs with perfect flowers.
    - Leaves becoming spiny; fruiting calyx surrounded by a wing .... Salsola (p. 240).
    - Leaves fleshy; fruiting calyx wingless .... Dondia (p. 240).
- Embryo annular.
  - Endosperm none; stems jointed; leaves scale-like .... Salicornia (p. 240).
  - Endosperm copious; stems not jointed; leaves not scale-like.
    - Pericarp adherent to the seed; fruit much exceeding the calyx .... Corispermum (p. 241).
    - Pericarp not adherent; fruit inclosed.
      - Flowers unisexual; fruit inclosed by 2 bractlets.
        - Shrubs; testa membranous.
          - Pericarp hairy .... Eurotia (p. 241).
          - Pericarp glabrous .... Grayia (p. 241).
        - Mostly herbs; testa coriaceous .... Atriplex (p. 241).
      - Flowers perfect.
        - Sepal 1, bract-like; stamen 1 .... Monolepis (p. 243).
        - Sepals 5, united; stamens 5.
          - Flowers capitate; calyx fleshy and red in fruit. Blitum (p. 243).
          - Flowers panicled; calyx dry or scarcely fleshy in fruit .... Chenopodium (p. 242).

SARCOBATUS.

1. **Sarcobatus vermiculatus** (Hook.) Torr. in Emory, Rep. 149. 1848. Greasewood.

Batis? vermiculatus Hook. Fl. Bor. Am. 2: 128. 1838.

Type locality: "Common on the barren grounds of the Columbia, and particularly near salt marshes." Collected by Douglas.

Range: Washington to Montana, New Mexico, and Arizona.

SPECIMENS EXAMINED: Coulee City, *Lake & Hull* 699; Alkali Lake, *Sandberg & Leiberg* 410; North Yakima, *Steinweg* in 1894; *Henderson*, June 18, 1892; Yakima City, *Piper*, July 10, 1897; Pasco, *Elmer* 1064; Morgans Ferry, *Suksdorf* 449; Walla Walla, *Lyall*, June, 1860; without locality, *Vasey* in 1889; Cow Creek, *Griffiths & Cotton* 540.

ZONAL DISTRIBUTION: Upper Sonoran.

For illustration see Plate IV, facing page 25.

SALSOLA.

1. **Salsola kali tragus** (L.) Moq. in DC. Prod. **13**²: 187. 1849. RUSSIAN THISTLE.

Salsola tragus L. Sp. Pl. ed. 2. **1**: 322. 1762.

TYPE LOCALITY: "Habitat in Europa australi."

SPECIMENS EXAMINED: Pasco, *Piper*, July 10, 1897; Spokane, *Kreager* 531.

The Russian thistle probably first reached Washington in 1895 or 1896. It is now widely spread in the State.

DONDIA.

Fruiting calyx without crests or appendages........................ 3. *D. maritima.*
Fruiting calyx developing keels or crests.
  Calyx developing crests on one or more of its lobes; leaves linear, broadest at base.. 2. *D. depressa.*
  Calyx at length surrounded by a transverse lobed wing; leaves linear, narrowed at base.................................. 1. *D. occidentalis.*

1. **Dondia occidentalis** (S. Wats.) Heller Cat. N. A. Plants 3. 1898.

Schoberia occidentalis S. Wats. Bot. King Explor. **5**: 295. 1871.

Suaeda occidentalis S. Wats. Proc. Am. Acad. **9**: 90. 1874.

TYPE LOCALITY: "Ruby Valley, Nevada."

RANGE: Washington to Nevada.

SPECIMENS EXAMINED: Coulee City, *Henderson* 2557; Crab Creek, *Suksdorf* 448; Lincoln County, *Elmer* 1241; Yakima City, *Piper* 2749, 2752.

ZONAL DISTRIBUTION: Upper Sonoran.

2. **Dondia depressa** (Pursh) Britton, Ill. Fl. **1**: 585. 1896.

Salsola depressa Pursh, Fl. **1**: 197. 1814.

Suaeda depressa Ledeb.; S. Wats. Bot. King Expl. **5**: 294. 1871.

TYPE LOCALITY: "On the volcanic plains of the Missouri."

RANGE: Washington to Saskatchewan, south to Nevada and Nebraska.

SPECIMENS EXAMINED: White Bluff Ferry, *Lake & Hull* 678. A doubtful immature specimen perhaps referable to the preceding.

ZONAL DISTRIBUTION: Upper Sonoran.

3. **Dondia maritima** (L.) Druce, Ann. Scot. Nat. Hist. **1896**: 42. 1896.

Chenopodium maritimum L. Sp. Pl. **1**: 221. 1753.

Suaeda maritima Dum. Fl. Belg. 22. 1827.

TYPE LOCALITY: "Habitat in Europae maritimis."

RANGE: Seacoasts, Maine to New York. Washington. Europe.

SPECIMENS EXAMINED: Salt marshes near Coupeville, *Gardner* 365.

SALICORNIA.

1. **Salicornia ambigua** Michx. Fl. **1**: 2. 1803.

TYPE LOCALITY: "In Carolinae scirpetis maritimis."

RANGE: Seabeaches, Massachusetts to Texas, British Columbia to California.

SPECIMENS EXAMINED: Port Angeles, *Piper*, September, 1895; Port Ludlow, *Binns*, September 3, 1890; Seattle, *Piper;* Union City, *Piper* in 1890; Port Townsend, *Barber* 188, 189.

ZONAL DISTRIBUTION: Humid Transition.

The Pacific Coast plant, judging from a small amount of herbarium material, is somewhat different from the typical *ambigua* of the Atlantic slope. Our plant was called *S. herbacea* L. in Cooper's Report and *S. radicans* L. in Hooker's Flora.

CORISPERMUM.

Akenes 3 to 5 mm. long, winged .... 2. *C. hyssopifolium.*
Akenes 2 to 2.5 mm. long, wingless .... 1. *C. villosum.*

1. **Corispermum villosum** Rydberg, Bull. Torr. Club **24**: 191. 1897.
TYPE LOCALITY: Manhattan, Montana.
RANGE: Washington, Montana, Nevada.
SPECIMENS EXAMINED: Sunnyside, *Cotton* 753.
ZONAL DISTRIBUTION: Upper Sonoran.

2. **Corispermum hyssopifolium** L. Sp. Pl. 1: 4. 1753. BUGSEED.
TYPE LOCALITY: "Habitat ad Volgam Tartariae, Gillan Borussiae, Monspelii arenosis."
RANGE: British Columbia and Saskatchewan, south to Arizona and Texas.
SPECIMENS EXAMINED: junction of Crab and Wilson creeks, *Sandberg & Leiberg* 309; west Klickitat County, *Suksdorf* 1385; Wawawai, *Piper* 1770; Rattlesnake Mountains, *Cotton* 885; Sunnyside, *Cotton* 754.
ZONAL DISTRIBUTION: Upper Sonoran.

EUROTIA.

1. **Eurotia lanata** (Pursh) Moq. Chenop. Mon. Enum. 81. 1840. WINTER FAT.
Diotis lanata Pursh, Fl. **2**: 602. 1814.
TYPE LOCALITY: "On the banks of the Missouri in open prairies." Collected by Lewis.
RANGE: Washington to Saskatchewan, south to California and New Mexico.
SPECIMENS EXAMINED: Egbert Springs, *Sandberg & Leiberg* 347; Sunnyside, *Piper* 2846; Rattlesnake Mountains, *Dunn*, September 10, 1902; Sunnyside, *Cotton* 752.
ZONAL DISTRIBUTION: Upper Sonoran.

GRAYIA.

1. **Grayia spinosa** (Hook.) Moq. in DC. Prod. 13^2: 119. 1849. HOP SAGE.
Chenopodium? spinosum Hook. Fl. Bor. Am. **2**: 127. 1838.
Grayia polygaloides Hook. & Arn. Bot. Beech. Voy. 388. 1841.
Eremosemium spinosum Greene, Pittonia **4**: 225. 1901.
TYPE LOCALITY: "Interior of North California. Douglas, 1826."
RANGE: Washington to Wyoming, Utah, and California.
SPECIMENS EXAMINED: Coulee City, *Piper* 3896; Crab and Wilson creeks, *Sandberg & Leiberg* 226; North Yakima, *Flett* 1028; *Mrs. Steinweg* in 1894; *Leckenby*, May 9, 1898; Pasco, *Piper* 2974; *Hindshaw* 40; Morgans Ferry, *Suksdorf* 447; Snipes Mountains, *Cotton* 389; Prosser, *Griffiths & Cotton* 16.
ZONAL DISTRIBUTION: Upper Sonoran.

ATRIPLEX.

Perennial, shrubby; leaves oblong, entire .... 5. *A. nuttallii.*
Annuals.
  Leaves densely scurfy and silvery .... 4. *A. argentea.*
  Leaves fleshy and mealy, not silvery.
    Flowers in axillary clusters; leaves linear.................... 3. *A. zosteraefolia.*
    Flowers in terminal panicles.
      Leaves ovate-triangular, usually dentate .... 1. *A. hastata.*
      Leaves lanceolate, mostly entire .... 2. *A. patula.*

1. **Atriplex hastata** L. Sp. Pl. **2**: 1053. 1753.
TYPE LOCALITY: "Habitat in Europa frigidiori."

RANGE: Washington to California, Nebraska, and Manitoba. Atlantic seacoast. Europe.

SPECIMENS EXAMINED: Prosser, *Cotton* 889.

Evidently introduced, and said to be spreading rapidly.

2. **Atriplex patula littoralis** Gray, Man. ed. 5. 409. 1867.

Atriplex littoralis L. Sp. Pl. **2**: 1054. 1753.

TYPE LOCALITY: "Habitat in Europae septentrionalis littoribus maris."

RANGE: Seacoasts of North America, Europe, and Asia. Great Lakes.

SPECIMENS EXAMINED: Port Angeles, *Piper*, September, 1895; Shoalwater Bay, *Henderson*, August, 1885; Seattle, *Piper* in 1887.

ZONAL DISTRIBUTION: Humid Transition.

3. **Atriplex zosteraefolia** (Hook.) S. Wats. Proc. Am. Acad. **9**: 109. 1874.

Chenopodium? zosteraefolium Hook. Fl. Bor. Am. **2**: 127. 1838.

TYPE LOCALITY: "N. W. C. of America. *Menzies.* Columbia and Straits of De Fuca." *Dr. Scouler.*

SPECIMENS EXAMINED: Straits of De Fuca [Wash.?], *Scouler.*

This peculiar species is known only from the type collections. Its rediscovery would be of much interest.

4. **Atriplex argentea** Nutt. Gen. **1**: 198. 1818.

TYPE LOCALITY: "On sterile and saline plains near the Missouri." Collected by Nuttall.

RANGE: Washington to Minnesota, southward to Colorado and Utah.

SPECIMENS EXAMINED: Alma, *Elmer* 31; Ellensburg, *Piper*, July 9, 1897; Yakima City, *Piper* 2753; Egbert Springs, *Sandberg & Leiberg* 372; Waitsburg, *Horner* 419.

ZONAL DISTRIBUTION: Upper Sonoran.

5. **Atriplex nuttallii** S. Wats. Proc. Am. Acad. **9**: 116. 1874.

Atriplex canescens Nutt. Gen. **1**: 197. 1818, not *Atriplex canescens* (Pursh, 1814) James.

TYPE LOCALITY: "On the denudated saline hills of the Missouri, commencing about 15 miles below the confluence of White River, and continuing to the mountains."

RANGE: Washington and Alberta to Nevada and Colorado.

SPECIMENS EXAMINED: Egbert Springs, *Sandberg & Leiberg* 349.

ZONAL DISTRIBUTION: Upper Sonoran.

CHENOPODIUM. GOOSEFOOT.

- Calyx fleshy and red in fruit .... 5. *C. rubrum.*
- Calyx dry in fruit.
  - Pericarp loosely attached to the seed; leaves entire .... 4. *C. leptophyllum.*
  - Pericarp firmly attached to the seed; leaves dentate.
    - Herbage glandular-pubescent .... 3. *C. botrys*
    - Herbage not glandular.
      - Leaves mealy beneath .... 1. *C. album.*
      - Leaves glabrous .... 2. *C. hybridum.*

1. **Chenopodium album** L. Sp. Pl. **1**: 219. 1753. LAMB'S QUARTERS.

TYPE LOCALITY: European.

SPECIMENS EXAMINED: Skamania County, *Suksdorf* 2055; Wilson Creek, *Lake & Hull*, August 6, 1892; *Sandberg & Leiberg* 257; Pullman, *Piper*, July 29, 1894. *Hardwick*, July 31, 1895.

1a. **Chenopodium album viride** (L.) Moq. in DC. Prod. **13**^{2}: 71. 1849.

Chenopodium viride L. Sp. Pl. **1**: 219. 1753.

TYPE LOCALITY: European.

SPECIMENS EXAMINED: Klickitat County, *Suksdorf* 1391, 669; Wawawai, *Piper* 3584.

2. **Chenopodium hybridum** L. Sp. Pl. **1**: 219. 1753.

Type locality: European.

Specimens examined: Cascade Mountains, latitude 49°, *Lyall* in 1858–59; Wenache, *Whited* 65; Yakima, *Piper* 1798; Rock Lake, *Lake & Hull*, August 3, 1892; Loomis, *Elmer* 590; Waitsburg, *Horner* 418; Pend Oreille River, *Lyall* in 1861; Clarks Springs, *Kreager* 567.

3. **Chenopodium botrys** L. Sp. Pl. **1**: 219. 1753.

Type locality: "Habitat in Europae australis arenosis."

Specimens examined: Almota, *Piper* 1824; without locality *Vasey* in 1889; Belleview, *Kreager* 496.

4. **Chenopodium leptophyllum** (Moq.) Nutt.; S. Wats. Proc. Am. Acad. **9**: 94. 1873.

Chenopodium album leptophyllum Moq. in DC. Prod. 13^2: 71. 1849.

Type locality: "In Nova California (Nuttall); Laplatte, Gordon."

Range: Washington to Saskatchewan, southward to Arizona and Missouri.

Specimens examined: Columbia River above Chelan River, *Watson* 338; Great Northern Tunnel, east side, *Piper*, July, 1895; Moses Lake, *Sandberg & Leiberg* 377; Crab and Wilson creeks, *Sandberg & Leiberg* 316; Ellensburg, *Piper*, July 9, 1897; Pasco, *Piper* 2963; Waitsburg, *Horner* 1089.

Zonal distribution: Upper Sonoran.

5. **Chenopodium rubrum** L. Sp. Pl. **1**: 218. 1753.

Type locality: European.

Range: British Columbia to Newfoundland, south to Oregon, Nebraska, and New Jersey. Europe. Asia.

Specimens examined: Cascade Mountains near Columbia River, *Suksdorf* 670; Bingen, *Suksdorf* 2325; Wawawai, *Piper* in 1901; Meyers Falls, *Kreager* 512.

Zonal distribution: Upper Sonoran?

5a. **Chenopodium rubrum humile** (Hook.) S. Wats. Bot. Cal. **2**: 48. 1880.

Chenopodium humile Hook. Fl. Bor. Am. **2**: 127. 1838.

Type locality: "Marshes of the Saskatchewan."

Range: British Columbia to Manitoba, south to California and Colorado.

Specimens examined: Port Townsend, *Edwards* in 1896; Seattle, *Piper* 2857; Shoalwater Bay, *Henderson* 694.

Zonal distribution: Humid Transition.

BLITUM.

1. **Blitum capitatum** L. Sp. Pl. **1**: 4. 1753. Blite.

Type locality: "Habitat in Europa: praesertim in comit. Tyrolensi."

Range: Yukon to California, the Great Lakes, and New Mexico.

Specimens examined: Cascade Mountains, latitude 49°, *Lyall* in 1859; Spokane, *Piper*, June 25, 1897; Pullman, *Hull* 682; *Piper*, July 25, 1900.

Zonal distribution: Arid Transition.

MONOLEPIS.

Leaves oblong, entire; flowers mostly solitary .... 1. *M. pusilla*.
Leaves lanceolate to spatulate, often dentate; flower clusters dense..... 2. *M. nuttalliana*.

1. **Monolepis pusilla** Torr.; S. Wats. Bot. King Explor. 289. 1871.

Type locality: "Near Carson City, and rather frequent in the alkaline valleys of Western Nevada."

Range: Eastern Washington to Nevada.

Specimens examined: Coulee City, *Piper* 3886; Crab and Wilson creeks, *Sandberg & Leiberg* 241; Morgans Ferry, *Suksdorf* 446.

Zonal distribution: Upper Sonoran.

2. Monolepis nuttalliana (Roem. & Schult.) Greene, Fl. Fran. 168. 1891.
Blitum chenopodioides Nutt. Gen. **1**: 4. 1818, not Lam.
Blitum nuttallianum Roem. & Schult. Mant. **1**: 65. 1822.
Monolepis chenopodioides Moq. in DC. Prod. **13**^{2}: 85. 1849.

Type locality: "On arid soils near the banks of the Missouri."

Range: Washington to Saskatchewan, southward to California and New Mexico.

Specimens examined: Ellensburg, *Piper*, May 20, 1897; Ritzville, *Sandberg & Leiberg* 165; Pullman, *Piper* 1844; Waitsburg, *Horner* 186.

Zonal distribution: Upper Sonoran and Arid Transition.

AMARANTHACEAE. Amaranth Family.

AMARANTHUS.

Flowers in dense terminal spikes.
    Spikes green, stout, 8 to 14 mm. thick.......................... 1. *A. retroflexus.*
    Spikes purple, slender, 4 to 6 mm. thick.......................... 2. *A. paniculatus.*
Flowers in small axillary clusters.
    Plants prostrate; sepals 4 or 5.......................... 3. *A. blitoides.*
    Plants erect, much branched; sepals 3.......................... 4. *A. graecizans.*

1. Amaranthus retroflexus L. Sp. Pl. **2**: 991. 1753. Pigweed.

Type locality: "Habitat in Pennsylvania."

Range: Temperate and subtropical North America, mainly spread as a weed.

Specimens examined: Pullman, *Piper* 1554.

2. Amaranthus paniculatus L. Sp. Pl. ed. 2. **2**: 1406. 1763.

Type locality: "Habitat in America."

Range: Naturalized in the United States from subtropical regions.

Specimens examined: Clarks Springs, *Kreager* 569. According to Hooker collected in 1825 by Scouler on the Columbia.

3. Amaranthus blitoides S. Wats. Proc. Am. Acad. **12**: 273. 1877.

Type locality: "Frequent in the valleys and plains of the interior, from Mexico to N. Nevada and Iowa, and becoming introduced in some of the Northern States eastward."

Range: Washington to Nevada, Colorado, and Mexico. Now spreading eastward.

Specimens examined: Pullman, *Piper* 1552; Spokane, *Kreager* 581.

Zonal distribution: Arid Transition.

4. Amaranthus graecizans L. Sp. Pl. **2**: 990. 1753. Tumbleweed.
Amaranthus albus L. Syst. ed. 10. 1268. 1760.

Type locality: "Habitat in Virginia."

Range: Spread as a weed throughout temperate and subtropical North America.

Specimens examined: West Klickitat County, *Suksdorf* 2079; Pasco, *Henderson* in 1892; Pullman, *Piper* 1553; Wawawai, *Piper*, July 31, 1893.

NYCTAGINACEAE. Four-o'clock Family.

ABRONIA.

Plants of the seashore.
    Flowers rose-colored; wings of the fruit thin.......................... 1. *A. umbellata.*
    Flowers yellow; wings of the fruit thick, hollow.......................... 2. *A. latifolia.*
Plant of the sage-plains; flowers white.......................... 3. *A. mellifera.*

1. Abronia umbellata Lam. Ill. **1**: 469. *pl. 105.* 1791.

Type locality: "Ex Californiae maritimis."

Range: Seacoast, Washington to California.

Specimens examined: Port Angeles, *Piper* 2301; Clallam County, *Elmer* 2790; Point-no-point, *Piper* in 1890.

Zonal distribution: Humid Transition.

2. **Abronia latifolia** Esch. Mem. Acad. St. Petersb. **10**: 281. 1826.
Abronia arenaria Menzies; Hook. Exot. Fl. **3**: *pl. 193*. 1827.
TYPE LOCALITY: "In arenosis maritimis Novae Californiae."
RANGE: Seashores, Vancouver Island to California.
SPECIMENS EXAMINED: Shoalwater Bay, *Cooper;* Clallam County, *Elmer* 2791; Port Angeles, *Piper* 2303; Port Townsend, *Henderson*, June 25, 1892; Westport, *Heller* 3943; *Lamb* 1096; Whidby Island, *Gardner* 253.
ZONAL DISTRIBUTION: Humid Transition.

3. **Abronia mellifera** Dougl.; Hook. Bot. Mag. **56**: *pl. 2879*. 1829.
Abronia suksdorfii Coult. & Fisher, Bot. Gaz. **17**: 348. 1892.
TYPE LOCALITY: "Near the Great [Celilo] Falls of the Columbia." Collected by Douglas.
RANGE: Eastern Washington and eastern Oregon.
SPECIMENS EXAMINED: Rock Island, *Sandberg & Leiberg* 464; Morgans Ferry *Suksdorf* 429; Columbus, *Suksdorf*, June 11, 1886; Sand hills of Columbia, *Nuttall;* Walla Walla, *Lyall*, June, 1860; *Douglas* in 1826; Priest Rapids, *Douglas* in 1826; Prosser, *Henderson* 2439; Pasco, *Piper* 2989; *Elmer* 1055; *Hindshaw* 16; Kiona, *Piper* 1807, 2646; *Cotton* 724.
ZONAL DISTRIBUTION: Arid Transition.

ABRONIA FRAGRANS Nutt. is listed by Suksdorf, but the plant probably does not occur in our limits.

AIZOACEAE.

MOLLUGO.

1. **Mollugo verticillata** L. Sp. Pl. **1**: 89. 1753. CARPET WEED.
TYPE LOCALITY: "Habitat in Africa, Virginia."
RANGE: Washington to New Brunswick and southward to Mexico and South America.
SPECIMENS EXAMINED: West Klickitat County, *Suksdorf* 1675; North Yakima, *Henderson*, October, 1892; Parker, *Elmer* 1077; Wawawai, *Piper*, August, 1894; Almota, *Piper* 1878, August, 1894; without locality, *Vasey* in 1889; Prosser, *Cotton* 632; Toppenish, *Cotton* 795.
ZONAL DISTRIBUTION: Upper Sonoran.

PORTULACACEAE. PURSLANE FAMILY.

Ovary half inferior; sepals partly united.......................... PORTULACA (p. 245).
Ovary superior.
  Capsule circumscissile .... LEWISIA (p. 246).
  Capsule not circumscissile.
    Style branches 2; capsule 2-valved, sepals scarious...... SPRAGUEA (p. 251).
    Style branches 3; capsule 3-valved.
      Sepals deciduous.................................. TALINUM (p. 247).
      Sepals persistent.
        Petals 3 to 7; stamens 3 to 12; leaves fleshy, alternate.. CALANDRINIA (p. 247).
        Petals 5.
          Corolla zygomorphic; styles short, cleft nearly to the base.............................. MONTIA (p. 247).
          Corolla regular; styles elongated, united nearly to the top.............................. CLAYTONIA (p. 248).

PORTULACA.

1. **Portulaca oleracea** L. Sp. Pl. **1**: 445. 1753. PURSLANE.
TYPE LOCALITY: "Habitat in Europa australi, India, Ins. Ascensionis, America."
SPECIMENS EXAMINED: White Salmon, *Suksdorf*, November, 1879; Almota, *Piper*, September, 1896; Wawawai, *Piper*, August, 1894; Meyers Falls, *Kreager* 517.

LEWISIA.

Sepals 4 to 8; scape jointed and with an involucre of 5 to 7 bracts......... 1. *L. rediviva.*
Sepals 2; scape 2-bracteolate.
  Root elongate.
    Seeds granulate, conspicuously strophiolate.................. 2. *L. tweedyi.*
    Seeds smooth, not at all strophiolate.
      Plants 2 to 8 cm. high; flowers 1 to 3.
        Sepals entire; petals white .... 3. *L. nevadensis.*
        Sepals erose; petals red............................ 4. *L. pygmaea.*
      Plants 10 to 20 cm. high; flowers several to many, red..... 5. *L. columbiana.*
  Root globose; cauline leaves 2 or 3, linear....................... 6. *L. triphylla.*

1. Lewisia rediviva Pursh, Fl. **2**: 368. 1814. ROCK ROSE. BITTERROOT.

TYPE LOCALITY: "On the banks of Clark's River." Collected by Lewis. The exact place is the mouth of the Lou Lou fork of the Bitterroot River, Montana.

RANGE: British Columbia to Wyoming, Arizona, and California.

SPECIMENS EXAMINED: Atanum River, *Flett* 1293; Wenache, *Whited* 1089; North Yakima *Henderson*, May, 1892; Rock Creek, *Sandberg & Leiberg* 127; Major Creek, *Suksdorf* 258; Sprague, *Henderson*, May, 1892; Spokane County, *Mrs. Tucker* in 1892; Spokane, *Piper*, July, 1896; without locality, *Vasey* in 1889; Ellensburg, *Piper* in 1897.

ZONAL DISTRIBUTION: Arid Transition.

2. Lewisia tweedyi (A. Gray) Robinson in Gray, Syn. Fl. 1: 268. 1895.

Calandrinia tweedyi A. Gray, Proc. Am. Acad. **22**: 277. 1887.

TYPE LOCALITY: "Wenatchee Mountains, Washington Territory." Collected by Tweedy and by Brandegee.

RANGE: Wenache Mountains, Washington.

SPECIMENS EXAMINED: Mount Stuart, *Tweedy* 898; *Brandegee; Sandberg & Leiberg* 346; Wenache Mountains, *Whited* 1242.

ZONAL DISTRIBUTION: Canadian?

3. Lewisia nevadensis (A. Gray) Robinson in Gray, Syn. Fl. 1: 268. 1895.

Calandrinia nevadensis A. Gray, Proc. Am. Acad. **8**: 623. 1873.

TYPE LOCALITY: "Subalpine region of Wahsatch and East Humboldt Mountains [Nevada] and Sierra Nevada, California, at Summit and Cisco."

RANGE: Washington to California and Utah.

SPECIMENS EXAMINED: Klickitat River, *Flett* 1275; Simcoe Hills, *Howell* 292; Wenache Mountains, *Elmer* 472; Blue Mountains, *Piper* 2391; Wenache Mountains, *Cotton* 1235.

ZONAL DISTRIBUTION: Hudsonian.

4. Lewisia pygmaea (A. Gray) Robinson in Gray, Syn. Fl. **1**: 268. 1895.

Talinum pygmaea A. Gray, Am. Journ. Sci. II. **33**: 407. 1862.

Orcobroma pygmaea Howell, Erythea **1**: 33. 1893.

TYPE LOCALITY: Rocky Mountains.

RANGE: Washington and Oregon to Montana and Colorado.

SPECIMENS EXAMINED: Cascade Mountains, latitude 49°, *Lyall* in 1860; Paradise Valley, *Flett* 284; Mount Adams, *Suksdorf* 336.

5. Lewisia columbiana (Howell) Robinson in Gray, Syn. Fl. **1**: 269. 1895.

Calandrinia columbiana Howell; Gray, Proc. Am. Acad. **22**: 277. 1887.

TYPE LOCALITY: "Mountains of Oregon and Washington Territory (coll. by Lyall as far north as lat. 49°)."

RANGE: British Columbia to Oregon in the Cascades and Olympics.

SPECIMENS EXAMINED: Olympic Mountains, *Piper* 2222; Cascade Mountains, latitude 49°, *Lyall* in 1860; Goat Mountain, *Allen* 205; Olympic Mountains, *Flett* 128; *Elmer* 2690; Mount Stuart, *Elmer* 1206; *Sandberg & Leiberg* 547; *Brandegee* 683; Head of Twisp River, *Whited*, July, 1896; Mount Henderson, *Henderson* 2044; Lacentre, *Mrs. Fanny Briggs* in 1887.

Zonal distribution: Hudsonian.

The Lyall specimen was referred to *Calandrinia leana* Porter in the Botany of California,[a] but that species does not reach our limits.

6. **Lewisia triphylla** (S. Wats.) Robinson in Gray, Syn. Fl. 1: 269. 1895.

Claytonia triphylla S. Wats. Proc. Am. Acad. **10**: 345. 1875.

Type locality: "Above Cisco, California;" in Yosemite Valley . . . and . . . in Sierra County.

Range: Washington and Idaho to California.

Specimens examined: Mount Adams, *Suksdorf*, August, 1880; *Henderson*, August, 1892; Goat Mountain, *Allen* 154; Klickitat River, *Flett* 1274; Simcoe Mountains, *Howell*, June, 1879, 290; Wenache Mountains, *Elmer* 464; Blue Mountains, *Piper* 2431.

Zonal distribution: Hudsonian.

TALINUM.

1. **Talinum spinescens** Torr. Bot. Wilkes Exped. 250. 1873.

Type locality: "Bare rocks between Fort Okanogan and Grand Coulie, on the Upper Columbia River."

Range: Central Washington.

Specimens examined: North Yakima, *Henderson*, May, 1892; *Steinweg* in 1894; Yakima, *Nevius*, April, 1890; Johnson Canyon, *Brandegee* in 1883; Great Plains, *Dr. T. E. Wilcox* in 1883; Coal and Crab creeks, *Sandberg & Leiberg* 227; Wilson Creek, *Lake & Hull*, August, 1892; between Coulee City and Waterville, *Spillman*, May, 1896; Coulee City, *Lake & Hull*, August, 1892; *Piper* 3871; near Cottonwood, *Suksdorf* 257.

Zonal distribution: Arid Transition.

CALANDRINIA.

1. **Calandrinia caulescens** H. B. K. Nov. Gen. & Sp. **6**: 78. *pl. 526*. 1823.

Type locality: "Crescit in Regno Quitensi, prope Chillo, villam contiguam planitiei Cachapambensi, alt. 1340 hex.; item prope urbem Mexici, alt. 1168 hex."

Range: Washington to Mexico. South America.

Specimens examined: Coupeville, *Gardner* 36; Orcas Island, *Lyall* in 1858; west Klickitat County, *Suksdorf* 955, 251; Seattle, *Smith* in 1889.

Zonal distribution: Humid Transition.

2. **Calandrinia caulescens menziesii** (Hook.) A. Gray, Proc. Am. Acad. **22**: 277. 1887

Talinum menziesii Hook. Fl. Bor. Am. 1: 223. 1833.

Type locality: "North-West coast of America, south of the Columbia," *Menzies*.

Range: British Columbia to California in the coast region.

Specimens examined: Without locality, *Cooper*.

MONTIA.

1. **Montia fontana** L. Sp. Pl. **1**: 87. 1753.

Montia minor Gmel. Fl. Bad. **1**: 301. 1805.

Type locality: European.

Range: Subarctic regions, south to Maine and California. Europe. Asia.

Specimens examined: Whidby Island, *Gardner* 50; Tacoma, *Flett* 891, 27; Wenache, *Whited* 1015; Ellensburg, *Piper* 2715; Rock Creek, *Sandberg & Leiberg* 89; Seattle, *Piper*.

Zonal distribution: Transition.

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[a] Brewer & Wats. Bot. Cal. **2**: 435. 1880.

CLAYTONIA.

- Perennials with thick roots or corms.
  - Corm globose; cauline leaves oblong.................... 1. ***C. lanceolata.***
  - Caudex elongate; cauline leaves linear-spatulate.......... 2. ***C. megarrhiza.***
- Perennials or annuals; roots not cormose.
  - Stems bearing only two leaves, these opposite.
    - Cauline leaves not united.
      - Pedicels mostly bractless; perennial by rootstocks. 3. ***C. asarifolia.***
      - Pedicels mostly with bracts; roots fibrous.
        - Perennial, 10 to 50 cm. high; leaves ovate.... 4. ***C. sibirica.***
        - Annual, 5 to 15 cm. high; leaves narrow.... 5. ***C. arenicola.***
    - Cauline leaves united, at least at base.
      - United leaves forming a roundish disk.
        - Calyx 4 mm. long; seeds 2 mm. broad...... 6. ***C. perfoliata.***
        - Calyx 2 mm. long; seeds 1 mm. broad.
          - Basal leaves linear...................... 7. ***C. parviflora.***
          - Basal leaves ovate...................... 7a. ***C. parviflora depressa.***
      - United leaves not forming a disk, but linear or lanceolate.................................. 8. ***C. spathulata.***
  - Stems bearing more than two opposite leaves, or leaves alternate.
    - Cauline leaves several pairs, opposite................ 9. ***C. chamissoi.***
    - Cauline leaves alternate.
      - Perennial, producing slender stolons; leaves very fleshy.................................... 10. ***C. parvifolia.***
      - Annual, not stoloniferous; leaves not very fleshy.
        - Leaves broad, long-petioled; seeds striate.... 11. ***C. diffusa.***
        - Leaves narrow, sessile.
          - Seeds dull, less than 1 mm. broad...... 12. ***C. dichotoma.***
          - Seeds shining.
            - Petals 4 mm. long; seeds 2 mm. broad......................... 13. ***C. linearis.***
            - Petals minute or absent; seeds 1 mm. broad......................... 14. ***C. howellii.***

1. **Claytonia lanceolata** Pursh, Fl. 1: 175. 1814.

TYPE LOCALITY: "On the Rocky Mountains." Collected by Lewis, the exact place on the Lolo Trail, Bitterroot Mountains, Idaho.

RANGE: British Columbia to Wyoming and California.

SPECIMENS EXAMINED: Olympic Mountains, *Piper* 2228; Mount Rainier, *Piper* 2108; Cascade Mountains, latitude 49°, *Lyall* in 1860; Goat Mountain, *Allen* 87; Cleman Mountain, *Henderson*, June 14, 1892; Klickitat County, *Suksdorf*, June, 1878; Stevens Pass, *Sandberg & Leiberg* 752; Simcoe Mountains, *Howell*, June, 1879; Blue Mountains, *Horner* 63; Klickitat Hills, *Gorman*, April, 1895.

ZONAL DISTRIBUTION: Hudsonian and Canadian.

2. **Claytonia megarrhiza** (A. Gray) Parry; Wats. Bibl. Index 118. 1878.

Claytonia arctica megarrhiza A. Gray, Am. Journ. Sci. II. **33**: 406. 1862.

TYPE LOCALITY: Rocky Mountains. Collected by Parry.

RANGE: Washington to Alberta, Oregon, and Colorado.

SPECIMENS EXAMINED: Mount Stuart, *Elmer* 1224; Fish Lake, *Dunn*, August 4, 1900.

3. **Claytonia asarifolia** Bong. Mem. Acad. St. Petersb. VI. **2**: 137. 1832.

Claytonia cordifolia Wats. Proc. Am. Acad. **17**: 365. 1882.

Montia asarifolia Howell, Erythea **1**: 39. 1893.

Type locality: Sitka, Alaska.

Range: Alaska to Idaho and California.

Specimens examined: Olympic Mountains, *Piper* 2219; *Flett* 88; Goat Mountain, *Allen* 153; Cascade Mountains, *Mrs. Steinweg* in 1895; Silverton, *Bouck* 36; Klickitat River, *Flett* 1277; Kittitas Mountain, *Whited* 1284; head of Atanum River, *Henderson*, August 24, 1892; Falcon Valley, *Suksdorf* 103; Nason Creek, *Sandberg & Leiberg* 603; Pend Oreille River, *Lyall* in 1861; Blue Mountains, *Piper*, July 15, 1896; without locality, *Vasey* in 1889.

Zonal distribution: Canadian.

4. **Claytonia sibirica** L. Sp. Pl. **1**: 204. 1753.
Claytonia alsinoides Sims, Bot. Mag. **32**: *pl. 1309*. 1810.
Montia washingtoniana Suksdorf, Deutsch. Bot. Monatss. **16**: 220. 1898.
Montia sibirica Howell, Erythea **1**: 39. 1893.

Type locality: "Habitat in Siberia."

Range: Alaska to California and Idaho.

Specimens examined: Montesano, *Heller* 3861; Admiralty Head, *Piper*, May, 1898; Seattle, *Piper*, July, 1895; King County, *Suksdorf* 957; Silverton, *Bouck* 35; Olympia, *Kincaid*, July, 1896; Mount Rainier, *Flett* 241; upper Nisqually Valley, *Allen* 151; Mount Baker, *Flett* 854; Skokomish River, *Kincaid*, May, 1892; west Klickitat County, *Suksdorf* 2245, 256; Horseshoe Basin, *Lake & Hull* 426; Spokane, *Watson* 60; *Dewart* in 1901; without locality, *Cooper* in 1854; Clarks Springs, *Kreager* 32; Tukanon River, *Lake & Hull* 425.

Zonal distribution: Transition.

5. **Claytonia arenicola** Henderson, Bull. Torr. Club **22**: 49. 1895.
Montia arenicola Howell, Fl. N. W. Am. 96. 1897.

Type locality: Lewiston, Idaho. Collected by Henderson.

Range: Idaho and Eastern Washington.

Specimens examined: Spokane Valley, *Lyall* in 1861; Spokane, *Piper* 2290; *Henderson* 2430; Hangman Creek, *Sandberg & Leiberg* 15; Waitsburg, *Horner* 64; Wawawai, *Elmer* 121; *Piper* 2799, 3822; Clarkston, *Hunter* 6.

Zonal distribution: Upper Sonoran and Arid Transition.

6. **Claytonia perfoliata** Donn; Willd. Sp. Pl. 1^2: 1186. 1797.
Montia perfoliata Howell, Erythea **1**: 38. 1893.

Type locality: "Habitat in America boreali."

Range: British Columbia and Idaho to California and Arizona.

Specimens examined: Seattle, *Piper* in 1885; without locality, *Vasey* 171; west Klickitat County, *Suksdorf* 529, 530, 1879; Blue Mountains, *Horner* 67.

Zonal distribution: Humid Transition.

6a. **Claytonia perfoliata amplectens** Greene, Fl. Fran. 179. 1891.

Type locality: "Middle elevations of the Sierra," California.

Specimens examined: Seattle, *Piper* in 1888; without locality, *Vasey* in 1889.

This is merely a form in which the cauline leaves are nearly or quite separate.

7. **Claytonia parviflora** Dougl.; Hook. Fl. Bor. Am. **1**: 225. 1833.
Montia parviflora rupestris Suksdorf, Deutsch. Bot. Monatss. **16**: 221. 1898.
Montia parviflora hydrophila Suksdorf, loc. cit.
Montia parviflora silvatica Suksdorf, op. cit. 222.
Montia interrupta Suksdorf, loc. cit.
Montia parviflora Howell, Erythea **1**: 38. 1893.

Type locality: "Abundant along the course of the Columbia, in open parts of the forest where wood has been burned, or the ground turned up by deer." *Douglas.*

Range: British Columbia to California, Idaho, and Utah.

Specimens examined: Tacoma, *Flett* 83; Olympia, *Henderson*, May 24, 1892; west Klickitat County, *Suksdorf* 531, 956, 2017, 2097, 2092; Sprague, *Sandberg & Leiberg* 204;

Pullman, *Elmer* 845; *Hull*, May, 1892; Tukanon River, *Lake*, July 1, 1892; Waitsburg, *Horner* 66; Skamania County, *Suksdorf* 2304, 2305; Tacoma, *Flett* 2157, 2197.

ZONAL DISTRIBUTION: Transition.

7a. **Claytonia parviflora depressa** A. Gray, Proc. Am. Acad. **22**: 281. 1887.

Montia latifolia Suksdorf, Deutsch. Bot. Monatss. **16**: 222. 1898.

Montia arenaria Suksdorf, loc. cit.

Montia humifusa Howell, Fl. N. W. Am. 96. 1897.

Montia rubra Howell, Erythea **1**: 38. 1893.

Montia parviflora depressa Robinson in Gray, Syn. Fl. **1**: 274. 1895.

?*Claytonia parviflora glauca* Nutt.; Torr. & Gr. Fl. N. Am. **1**: 200. 1838.

TYPE LOCALITY: "On river banks, probably sand-washes, Brit. Columbia to Oregon and adjacent Idaho."

RANGE: British Columbia to Oregon and Idaho.

SPECIMENS EXAMINED: San Juan Island, *Lyall* in 1858; Coupeville, *Gardner* 53; Admiralty Head, *Piper*, May, 1898; Tacoma, *Flett* 2259, 85; Ellensburg, *Piper*, May 20, 1897; Douglas County, *Spillman*; west Klickitat County, *Suksdorf* 532, 1880, 1881, 2009, 2010, 2199; Waitsburg, *Horner* 65; Blue Mountains, *Horner* 68.

ZONAL DISTRIBUTION: Transition.

8. **Claytonia spathulata** Dougl.; Hook. Fl. Bor. Am. **1**: 226. 1833.

Montia spathulata Howell, Erythea **1**: 38. 1893.

Montia spathulata disciformis Suksdorf, Deutsch. Bot. Monatss. **16**: 222. 1898.

TYPE LOCALITY: "North-West coast of America" *Menzies*. "In the vallies of the Rocky Mountains" *Douglas*.

RANGE: British Columbia to California.

SPECIMENS EXAMINED: Laidlaw, *Lamb* 1116; Tacoma, *Flett* 86, 4, 880; Klickitat County, *Howell*, June, 1879; Major Creek, *Suksdorf* 2095.

8a. **Claytonia spathulata exigua** (Torr. & Gr.)

Claytonia exigua Torr. & Gr. Fl. **1**: 200. 1838.

Montia spathulata exigua Robinson in Gray, Syn. Fl. **1**: 275. 1895.

TYPE LOCALITY: California. Collected by Douglas.

RANGE: British Columbia to California, in the coast region.

SPECIMENS EXAMINED: Coupeville, *Gardner* 54; Bingen, *Suksdorf* 2094; White Salmon, *Suksdorf* 255.

9. **Claytonia chamissoi** Ledeb.; Spreng. Syst. **1**: 790. 1825.

Claytonia chamissonis Esch. Linnaea **6**: 562. 1831.

Montia chamissonis Greene, Fl. Fran. 180. 1891.

TYPE LOCALITY: "Unalaschka."

RANGE: Alaska to California and Colorado. Minnesota.

SPECIMENS EXAMINED: Roy, *Allen*, May 17, 1889; Falcon Valley, *Suksdorf* 958; Upper Wenas River, *Henderson*, June, 1892; Klickitat River, *Flett* 1288; Spokane County, *Sandberg & Leiberg* 88; Pullman, *Elmer* 818; *Piper* 1712; without locality, *Cooper*.

ZONAL DISTRIBUTION: Transition.

10. **Claytonia parvifolia** Moc.; DC. Prod. **3**: 361. 1828.

Claytonia filicaulis Hook, Fl. Bor. Am. **1**: 224. *pl. 72*. 1834.

Montia parvifolia Greene, Fl. Fran 181. 1891.

TYPE LOCALITY: Nootka Sound, Vancouver Island.

RANGE: Alaska to California and Montana.

SPECIMENS EXAMINED: Cascade Mountains, latitude 49°, *Lyall* in 1859; Tacoma, *Flett* 213; Skokomish River, *Henderson*, May, 1892; Silverton, *Bouck* 37; Mount Rainier, *Flett* 1405; *Piper*, August, 1895; upper Nisqually Valley, *Allen* 152, 152a; west Klickitat County *Suksdorf* 1878; Klickitat River, *Flett* 1290; Yakima County, *Brandegee* 686; Peshastin, *Sandberg & Leiberg* 585; Horseshoe Basin, *Lake & Hull*, August, 1892; Bridge Creek, *Elmer* 713; without locality, *Cooper*.

ZONAL DISTRIBUTION: Canadian and Transition.

11. Claytonia diffusa Nutt.; Torr. & Gr. Fl. **1**: 202. 1838.

Montia diffusa Greene, Fl. Fran. 181. 1891.

TYPE LOCALITY: "In pine woods, a few miles above Fort Vancouver." Collected by Nuttall.

RANGE: Washington to California in the coast region.

SPECIMENS EXAMINED: Gig Harbor, *Flett* 5; Larm River, *Suksdorf* 104; Seattle, *Piper* in 1885.

ZONAL DISTRIBUTION: Humid Transition.

12. Claytonia dichotoma Nutt.; Torr. & Gr. Fl. **1**: 202. 1838.

Montia dichotoma Howell, Erythea **1**: 36. 1893.

TYPE LOCALITY: "In wet places on rocks, near the junction of the Wahlamet with the Oregon." Collected by Nuttall.

RANGE: Washington, Idaho, and Oregon.

SPECIMENS EXAMINED: Klickitat Hills, *Gorman*, April, 1895; *Howell* 89; White Salmon, *Suksdorf*, June, 1878; Spokane, *Piper* 2667, May 19, 1899; Pullman, *Elmer* 173; without locality, *Geyer* 648.

ZONAL DISTRIBUTION: Arid Transition.

13. Claytonia linearis Dougl.; Hook. Fl. Bor. Am. **1**: 224, *pl. 71*. 1834.

Montia linearis Greene, Fl. Fran. 181. 1891.

TYPE LOCALITY: "Moist rocky places; on the Great and Little Falls of the Columbia, abundant." *Douglas*.

RANGE: British Columbia to Montana and California.

SPECIMENS EXAMINED: Whidby Island, *Gardner* 55; Tacoma, *Flett* 3; Klickitat River, *Flett* 1289; Hangman Creek, *Sandberg & Leiberg* 41; without locality, *Douglas*; without locality, *Geyer* 317; Pullman, *Elmer* 157; *Piper* 1713; *Hull*, May 24, 1892; *Moore*, May 16, 1893; Vancouver, *Piper* 4946; Seattle, *Piper* in 1889.

ZONAL DISTRIBUTION: Transition.

14. Claytonia howellii (S. Wats.).

Montia howellii S. Wats. Proc. Am. Acad. **18**: 191. 1883.

TYPE LOCALITY: "On Sauvies Island, in the Willamette River, Oregon." Collected by Howell.

RANGE: British Columbia to Oregon in the coast region.

SPECIMENS EXAMINED: Seattle, *Piper* 241.

ZONAL DISTRIBUTION: Humid Transition.

SPRAGUEA.

1. Spraguea multiceps Howell, Erythea **1**: 39. 1893.

Spraguea umbellata caudicifera A. Gray, Syn. Fl. **1**: 278. 1895.

TYPE LOCALITY: Mount Hood, Oregon.

RANGE: Washington and Oregon to Wyoming.

SPECIMENS EXAMINED: Cascade Mountains, latitude 49°, *Lyall* in 1860; Mount Raimer, *Piper* 2091, 37; *Allen* 101; Mount Adams, *Suksdorf*, September, 1877; *Flett* 1052; Nason Creek, *Sandberg & Leiberg* 659; without locality, *Cooper*.

ZONAL DISTRIBUTION: Arctic.

SILENACEAE. Pink Family.

- Sepals united; petals long-clawed.
  - Calyx 10 to many-nerved.
    - Styles 3, rarely 4 or 5; capsule with 3 or 6 teeth........ Silene (p. 252).
    - Styles always 5; capsule with 5 or 10 teeth.
      - Calyx with tooth-like lobes........................ Lychnis (p. 255).
      - Calyx with the lobes foliaceous...................... Agrostemma (p. 256).
  - Calyx 5-nerved; styles 2.
    - Calyx cylindric, not angled.......................... Saponaria (p. 256).
    - Calyx ovate, angled................................ Vaccaria (p. 256).
- Sepals free to the base or nearly so.
  - Stipules wanting.
    - Petals 2-cleft or 2-parted, rarely none.
      - Capsule cylindric, usually curved.................. Cerastium (p. 256).
      - Capsule ovate or oblong, not curved................ Alsine (p. 257).
    - Petals entire or notched, rarely none.
      - Styles as many as the sepals and alternate with them. Sagina (p. 259).
      - Styles fewer than the sepals or opposite them.
        - Disk of the receptacle conspicuous, 8 to 10-lobed. Ammodenia (p. 260).
        - Disk wanting.
          - Seeds each with a strophiole............. Moehringia (p. 260).
          - Seeds without strophioles................ Arenaria (p. 260).
  - Stipules present, scarious.
    - Fruit a one-seeded utricle; sepals spine-tipped.......... Pentacaena (p. 264).
    - Fruit a capsule; sepals not spine-tipped.
      - Styles and valves of the capsule 5................ Spergula (p. 263).
      - Styles and valves of the capsule 3................ Tissa (p. 263).

SILENE. Catchfly.

- Calyx with 15 nerves or more.
  - Nerves 18 to 23, prominent.............................. 1. *S. multinervia.*
  - Nerves 15 to 20, obscure............................... 2. *S. vulgaris.*
- Calyx with 10 nerves.
  - Plants annual or biennial.
    - Inflorescence a simple raceme......................... 3. *S. anglica.*
    - Inflorescence a cyme or a panicle.
      - Plant sticky hairy............................... 4. *S. noctiflora.*
      - Plant glabrous, except that the middle portion of each of the upper internodes is glutinous............ 5. *S. antirrhina.*
  - Plants perennial.
    - Acaulescent and densely matted...................... 6. *S. acaulis.*
    - Caulescent.
      - Flowers solitary in the forks of leafy branches...... 7. *S. menziesii.*
      - Flowers in terminal panicles, or occasionally solitary.
        - Calyx cylindric, narrowed at base; ovary stipitate.
          - Blades of the petals cleft into 4 to 8 linear lobes................................ 8. *S. oregana.*
          - Blades of the petals cleft into 2 lobes.
            - Stems very leafy, petal-lobes small, entire.............................. 9. *S. spaldingii.*
            - Stems not very leafy, petal-lobes notched......................... 10. *S. scouleri.*
        - Calyx campanulate; ovary not stipitate.
          - Plant 5 to 10 cm. high; flowers 1 to 3..... 11. *S. suksdorfii.*
          - Plants taller; flowers often numerous.
            - Blades of petals 2-lobed............. 12. *S. douglasii.*
            - Blades of petals 4-lobed, the lateral lobes smaller.................... 13. *S. macounii.*

1. **Silene multinervia** S. Wats. Proc. Am. Acad. **25**: 126. 1890.
Type locality: "Near Jamuel," California.
Range: California.
Specimens examined: Whidby Island, *Gardner* 44, doubtless introduced from California.

2. **Silene vulgaris** (Moench.) Garcke, Fl. Deutschl. ed. 9. 64. 1869.
Behen vulgaris Moench, Meth. 709. 1794.
Silene cucubalus Wibel, Prim. Fl. Werth. 241. 1799.
Cucubalus behen L. Sp. Pl. **1**: 414. 1753, not *Silene behen* L.
Type locality: European.
Specimens examined: Seattle. *Piper* 1817.

3. **Silene anglica** L. Sp. Pl. **1**: 416. 1753.
Silene gallica L. Sp. Pl. **1**: 417. 1753.
Type locality: "Habitat in Anglia, Gallia."
Specimens examined: Whatcom County, *Suksdorf* 1847; Seattle, *Piper*.

4. **Silene noctiflora** L. Sp. Pl. **1**: 419. 1753.
Type locality: "Habitat in Suecia, Germania."
Specimens examined: Whidby Island, *Gardner* 34; Silverton, *Bouck* 151 b; White Salmon, *Suksdorf* 525; Pullman, *Piper* 1854.

5. **Silene antirrhina** L. Sp. Pl. **1**: 419. 1753.
Type locality: "Habitat in Virginia, Carolina."
Range: Temperate North America.
Specimens examined: Mason County, *Kincaid*, June, 1892; Clallam County, *Elmer* 2750; Tacoma, *Flett*, June, 1896; west Klickitat County, *Suksdorf* 1857; Stehekin, *Whited* 1404; Spokane, *Henderson*, June, 1892; Almota, *Piper* 1707; without locality, *Vasey* in 1889; Clarks Springs, *Kreager* 111; Seattle, *Piper* in 1888.
Zonal distribution: Upper Sonoran and Transition.

6. **Silene acaulis** L. Sp. Pl. ed. 2. **1**: 603. 1762.
Type locality: "Habitat in alpibus Lapponicis, Austriacis, Helveticis, Pyrenaeis."
Range: Arctic regions, south to the White Mountains, and in the west to Washington and Arizona. Europe. Asia.
Specimens examined: Cascade Mountains, latitude 49°, *Lyall* in 1860; Mount Elinor, *Miss Getty*, August, 1902; Mount Rainier, *Flett* 31; Bridge Creek, *Elmer* in 1897.
Zonal distribution: Arctic.

7. **Silene menziesii** Hook. Fl. Bor. Am. **1**: 90. *pl. 30.* 1830.
Silene stellarioides Nutt.; Torr. & Gr. Fl. **1**: 193. 1838.
Type locality: "North-West coast of America." Collected by Menzies.
Range: British Columbia and Assiniboia to California and Nebraska.
Specimens examined: Clallam County, *Elmer* 2751; Hope Island, *Flett* 2112; Whidby Island, *Gardner* 41; Admiralty Head, *Piper*, May, 1898; Thorp, *Whited* 634; Beaver Creek. *Whited* 231; Wenache, *Whited* 156; Falcon Valley, *Suksdorf* 1854; North Yakima, *Henderson* in 1892; *Watt*, August, 1895; Wilson Creek, *Lake & Hull*, August, 1892; Harrington, *Sandberg & Leiberg* 222; Spokane, *Spalding;* without locality, *Vasey* in 1889; "on the Okanogan," *Douglas;* Asotin Creek, *Hunter*, June, 1900; Clarks Springs, *Kreager* 48, 620, 260; Pullman, *Piper*, June, 1893; Blue Mountains, *Horner*, July 17, 1896.
Zonal distribution: Transition and Upper Sonoran.

Professor Greene has recently proposed the genus Anotites, based on this species which he regards as an aggregate of several. Of these *A. viscosa* Greene[a] is based on Horner's Blue Mountains collection and *A. nodosa*[b] on Whited's Wenache collection.

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[a] Leaflets **1**: 98. 1905.

[b] Op. cit. 100.

8. Silene oregana S. Wats. Proc. Am. Acad. **10:** 343. 1875.

TYPE LOCALITY: "In the Blue Mountains, Oregon." Collected by Nevius.

RANGE: Oregon and Washington to Montana.

SPECIMENS EXAMINED: Upper Naches River, *Henderson* 2567; Mount Stuart, *Elmer* 1237; White Salmon, *Suksdorf* in 1878; Simcoe Hills, *Howell* 311; Skamania County, *Suksdorf* 2038; Wenache Mountains, *Whited* 1297; Clarks Springs, *Kreager* 576; Blue Mountains, *Piper* 2393.

ZONAL DISTRIBUTION: Canadian and Hudsonian.

9. Silene spaldingii S. Wats. Proc. Am. Acad. **10:** 344. 1875.

TYPE LOCALITY: "On the Clear Water," Idaho. Collected by Spalding.

RANGE: Washington, Oregon, and Idaho.

SPECIMENS EXAMINED: Cheney, *Mrs. Tucker* in 1900.

ZONAL DISTRIBUTION: Arid Transition.

10. Silene scouleri Hook. Fl. Bor. Am. **1:** 88. 1830.

TYPE LOCALITY: Fort Vancouver, Washington. Collected by Scouler.

RANGE: British Columbia to Oregon and Colorado.

SPECIMENS EXAMINED: Chambers Prairie, *Henderson*, August 8, 1892; Yelm Prairie, *Smith* 621; Tacoma, *Flett* 875; Lake Park, *Piper*, July 27, 1896; near Mount Stuart, *Brandegee* 656; Tieton River, *Cotton* 491; Blue Mountains, *Horner* 571.

ZONAL DISTRIBUTION: Arid Transition.

11. Silene suksdorfii Robinson, Bot. Gaz. **16:** 44. 1891.

TYPE LOCALITY: "Mt. Paddo (Adams), at 7,000 to 8,000 feet altitude." Collected by Suksdorf.

RANGE: Washington to California.

SPECIMENS EXAMINED: Mount Rainier, *Allen*, 239; *Piper* 2135, 623; Mount Stuart, *Elmer* 1178; *Brandegee* 654; Mount Adams, *Henderson*, August, 1892; *Suksdorf* 47; *Howell & Henderson*, August, 1882; White River, *Flett* 304.

ZONAL DISTRIBUTION: Arctic.

12. Silene douglasii Hook. Fl. Bor. Am. **1:** 88. 1830.

Silene dilatata Suksdorf, Deutsch. Bot. Monatss. **16:** 212. 1898.

TYPE LOCALITY: "Abundant in mountain valleys, above the Grand Rapids of the Columbia, and among the Rocky Mountains on their western declivity." Collected by Douglas.

RANGE: British Columbia to California and Montana.

SPECIMENS EXAMINED: Olympic Mountains, *Piper* 2216; *Elmer* 2744, 2747; Wenache, *Whited* 14; Mount Stuart, *Sandberg & Leiberg* 574; Goat Mountains, *Allen* 124a; west Klickitat County, *Suksdorf* 2156; Falcon Valley, *Suksdorf* 7; Blue Mountains, *Lake & Hull*, July 1, 1892; without locality, *Vasey* in 1889; Cape Horn, *Piper* 5016.

ZONAL DISTRIBUTION: Hudsonian to Transition.

12a. Silene douglasii monantha (S. Wats.) Robinson, Proc. Am. Acad. **28:** 145. 1893.

Silene monantha S. Wats. Proc. Am. Acad. **10:** 340. 1875.

TYPE LOCALITY: "On the débris at the base of Castle Rock, Cascades," Washington. Collected by Harford & Dunn.

SPECIMENS EXAMINED: Castle Rock, *Harford & Dunn*.

This is probably only a starved shade plant, and not distinct. It is known only from the type specimen.

12b. Silene douglasii brachycalyx Robinson, Proc. Am. Acad. **28:** 145. 1893.

Silene columbiana Howell, Fl. N. W. Am. 78. 1897.

TYPE LOCALITY: Multnomah County, Oregon.

RANGE: Washington and Oregon.

SPECIMENS EXAMINED: Cape Horn, Skamania County, *Suksdorf* 2436; Baldy Peak, Chehalis County, *Lamb* 1321.

12c. Silene douglasii multicaulis (Nutt.) Robinson, Proc. Am. Acad. **28**: 144. 1893.

Silene multicaulis Nutt.; Torr. & Gr. Fl. **1**: 192. 1838.

TYPE LOCALITY: "Woods from the west side of the Rocky Mountains to the Pacific." Collected by Nuttall.

RANGE: British Columbia to Oregon and Montana.

SPECIMENS EXAMINED: Wenache, *Whited* 141, 1146; Ellensburg, *Elmer* 415; Spokane, *Henderson*, July, 1892; *Ramm*, July, 1883; Spokane County, *Suksdorf* 250; *Kreager* 97; Blue Mountains, *Piper* 2402; without locality, *Vasey* in 1889; Yakima region, *Brandegee* 655 (doubtfully referred here, the plant being viscid throughout); Rattlesnake Mountains, *Cotton* 676.

ZONAL DISTRIBUTION: Arid Transition.

13. Silene macounii S. Wats. Proc. Am. Acad. **26**: 124. 1891.

? *Silene lyallii* S. Wats. Proc. Am. Acad. **10**: 342. 1875.

Silene douglasii macounii Robinson, Proc. Am. Acad. **28**: 144. 1893.

Silene douglasii macrocalyx Robinson, op. cit. 145, in part.

Silene douglasii viscida, Robinson, loc. cit.

Silene tetragyna Suksdorf, Deutsch. Bot. Monatss. **16**: 212. 1898.

TYPE LOCALITY: "Summit of the Rocky Mountains, British Columbia." Collected by Macoun.

RANGE: British Columbia to Oregon.

SPECIMENS EXAMINED: Olympic Mountains, *Piper* 2237, 917; Loomis, *Elmer* 579; Skagit Pass, *Lake & Hull* 489; Peshastin, *Sandberg & Leiberg* 529; Mount Stuart, *Elmer* 1178; *Sandberg & Leiberg* 817; Cascade Mountains, latitude 49°, *Lyall* in 1860; Mount Adams, *Suksdorf* 2434, 2435; Mount Rainier, *Piper* 622, 2119, 2109; *Smith* 936; Skamania County, *Suksdorf*, 1851; without locality, *Vasey* in 1889.

ZONAL DISTRIBUTION: Arctic.

Piper no. 622 is referred by Doctor Robinson[a] to *Silene watsonii*, but this seems to me an error. Better material collected later in the same place is certainly *S. macounii*. Smith's 936, once referred doubtfully[b] to *S. grayii*, is the same thing.

SILENE ARMERIA L. is occasionally encountered as a garden escape. *Silene hookeri* Nutt., included in Sukdorf's list, probably does not occur north of the Columbia River.

LYCHNIS.

Herbage white-tomentose; calyx-teeth twisted...................... 1. *L. coronaria*.
Herbage green, glandular-pubescent; calyx-teeth not twisted......... 2. *L. drummondii*.

1. Lychnis coronaria Desr. in Lam. Encycl. **3**: 643. 1789.

TYPE LOCALITY: European.

SPECIMENS EXAMINED: Mount Carlton, *Kreager* 144; Seattle, *Piper* in 1889.

A European species sometimes escaping from gardens and persisting.

2. Lychnis drummondii (Hook.) S. Wats. Bot. King Explor. 37, 432. 1872.

Silene drummondii Hook. Fl. Bor. Am. **1**: 89. 1830.

TYPE LOCALITY: "Plains of the Saskatchewan." Collected by Richardson and by Drummond.

Hooker gives further: "Common on the elevated, gravelly soils, near Fort Vancouver, and skirting the Blue Mountains. *Douglas*." As this species has not been collected in Washington or Oregon since Douglas's time, it is almost certain that there is some error in connection with Hooker's note.

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[a] Proc. Am. Acad. **28**: 143. 1893; Gray, Syn. Fl. **1**: 222. 1897.

[b] Proc. Am. Acad. loc. cit.

AGROSTEMMA.

1. **Agrostemma githago** L. Sp. Pl. **1**: 435. 1753. COCKLE.

TYPE LOCALITY: European.

SPECIMENS EXAMINED: Ellensburg, *Whited* 693; Pullman, *Piper*, July, 1894.

SAPONARIA.

1. **Saponaria officinalis** L. Sp. Pl. **1**: 408. 1753.

TYPE LOCALITY: European.

SPECIMENS EXAMINED: Union Gap, *Cotton* 428.

VACCARIA.

1. **Vaccaria vaccaria** (L.) Britton in Britt. & Br. Ill. Fl. **2**: 18. 1897. COW COCKLE.

Saponaria vaccaria L. Sp. Pl. **1**: 409. 1753.

TYPE LOCALITY: "Habitat inter segetes Galliae, Germaniae."

SPECIMENS EXAMINED: Rock Island, *Sandberg & Leiberg* 461; Waitsburg, *Horner* **395**; Wawawai, *Lake & Hull* 490; Pullman, *Piper* 1706; Meyers Falls, *Kreager* 498.

Very common and troublesome in grain fields.

CERASTIUM.

Petals not longer than the sepals.
Pedicels longer than the calyx .... 1. *C.* ***vulgatum.***
Pedicels not longer than the calyx .... 2. *C.* ***viscosum.***
Petals decidedly longer than the sepals.
Annual; viscid pubescent; pods nodding .... 3. *C.* ***nutans.***
Perennial; pubescent; pods erect .... 4. *C.* ***arvense.***

1. **Cerastium vulgatum** L. Sp. Pl. ed. 2. **1**: 627. 1762.

TYPE LOCALITY: "Habitat in Scaniae & Europae australioris pratis, arvis."

SPECIMENS EXAMINED: Spokane, *Sandberg & Leiberg* 40; Seattle, *Piper.*

2. **Cerastium viscosum** L. Sp. Pl. **1**: 437. 1753.

TYPE LOCALITY: European.

SPECIMENS EXAMINED: Whidby Island, *Gardner* 39; upper Nisqually Valley, ***Allen*** **112**; Waitsburg, *Horner* 129; Seattle, *Piper.*

3. **Cerastium nutans** Raf. Prec. Decouv. 36. 1814.

Cerastium longepedunculatum Muhl. Cat. 46. 1813, nom. nud.

TYPE LOCALITY: "En Pennsylvanie."

RANGE: British Columbia to Nova Scotia, south to New Mexico and North Carolina.

SPECIMENS EXAMINED: Wenache, *Whited* 47, 1016; Pend Oreille River, *Lyall* in 1861.

4. **Cerastium arvense** L. Sp. Pl. **1**: 438. 1753.

Cerastium elongatum Pursh, Fl. **1**: 321. 1814.

TYPE LOCALITY: "Habitat in Scania australiori Europa."

RANGE: North temperate zone in America, Asia, and Europe.

SPECIMENS EXAMINED: Clallam County, *Elmer* 2749*; Olympic Mountains, ***Flett*** **87*, 808***; Humptulips, *Lamb* 1174; Goat Mountains, *Allen* 237*; Mount Adams, ***Flett*** **1060**; Seattle, *Smith*, April, 1889; Cascade Mountains, latitude 49°, *Lyall* in 1859; Olympia, ***Henderson***, March, 1892; Skokomish Valley, *Kincaid*, June, 1892; without locality, ***Vasey*** **in** 1889; Pullman, *Moore*, May, 1893; *Elmer* 177; *Hull*, May, 1892.

ZONAL DISTRIBUTION: Transition to Arctic.

The specimens marked (*) are high alpine forms which approach *C. alpinum* ***behrringianum*** (Cham. & Schlecht.) Regel. Flett's 808 was listed as *C. alpinum* L. by **Wiegand**.[a]

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[a] Bull. Torr. Club **24**: 343. 1897.

ALSINE. CHICKWEED.

Lowest leaves petiolate.
Stems pubescent with a line of hairs; leaves ovate.......... 1. *A. media.*
Stems glabrous, except at base; leaves shiny, the upper linear-lanceolate.. 2. *A. nitens.*
Leaves all sessile.
Petals retuse or bifid at apex; leaves lanceolate; herbage glandular-pubescent.. 11. *A. jamesiana.*
Petals deeply 2-parted; herbage not glandular.
Bracts of the inflorescence small, scarious.
Pedicels spreading; cyme diffuse.
Leaves linear, acute at each end; seeds smooth.. 3. *A. longifolia.*
Leaves lanceolate, broadest near the base; seeds rough .... 4. *A. graminea.*
Pedicels erect; cymes few-flowered................ 5. *A. longipes.*
Bracts of the inflorescence leafy.
Leaves lanceolate; petals small or none............ 6. *A. borealis.*
Leaves ovate or ovate-lanceolate.
Sepals obtuse, without scarious margins .... 7. *A. obtusa.*
Sepals acute, with scarious margins.
Flowers cymose; leaves lance-ovate .... 8. *A. calycantha.*
Flowers solitary, axillary; leaves ovate.
Herbage glabrous.................... 9. *A. crispa.*
Herbage finely puberulent............ 10. *A. washingtoniana.*

1. **Alsine media** L. Sp. Pl. 1: 272. 1753. CHICKWEED.
Stellaria media Cirill. Char. Comm. 36. 1784.
TYPE LOCALITY: European.
RANGE: Europe and Asia. Introduced as a weed in North America.
SPECIMENS EXAMINED: Almota, *Piper*, May, 1897.
A common weed, nearly everywhere in the State.

2. **Alsine nitens** (Nutt.) Greene, Man. Bay Reg. 33. 1894.
Stellaria nitens Nutt.; Torr. & Gr. Fl. 1: 185. 1838.
TYPE LOCALITY: "Plains of the Oregon." Collected by Nuttall.
RANGE: British Columbia to California and Utah.
SPECIMENS EXAMINED: Seattle, *Smith* 587; Tacoma, *Flett* 100, 23; Nisqually Valley, *Allen* 145; Hangman Creek, *Sandberg & Leiberg* 43; Pullman, *Piper* 1834; *Elmer* 108; Blue Mountains, *Horner* 111.
ZONAL DISTRIBUTION: Upper Sonoran and Transition.

3. **Alsine longifolia** (Muhl.) Britton, Mem. Torr. Club **5**: 150. 1894.
Stellaria longifolia Muhl.; Willd. Enum. 479. 1809.
TYPE LOCALITY: "Habitat in Pennsylvania."
RANGE: Alaska to Newfoundland, south to Washington and Kentucky.
SPECIMENS EXAMINED: West Seattle, *Piper* 593; Marshall Junction, *Piper* 2258.

4. **Alsine graminea** (L.) Britton, Mem. Torr. Club **5**: 150. 1894.
Stellaria graminea L. Sp. Pl. 1: 422. 1753.
TYPE LOCALITY: European.
SPECIMENS EXAMINED: Seattle, *Piper* 740; Pullman, *Piper*, September 6, 1899.

5. **Alsine longipes** (Goldie) Coville, Contr. Nat. Herb. **4**: 70. 1893.

Stellaria longipes Goldie, Edinb. Phil. Journ. **6**: 327. 1822.

Type locality: "Woods near Lake Ontario."

Range: Alaska to California, Colorado, and New England. Siberia.

Specimens examined: Cascade Mountains, latitude 49°, *Lyall* in 1860; Falcon Valley, *Suksdorf* 102; Tacoma, *Flett* 193; Ocosta, *Henderson*, June, 1892; Clealum, *Henderson*, June 1892; Kittitas County, *Whited*, May, 1896; North Yakima, *Henderson*, May, 1892; Sprague, *Sandberg & Leiberg* 133a; Medical Lake, *Henderson*, June, 1892; Cold Creek, *Cotton* 397; *Kreager* 28; Pullman, *Hull* 481; *Piper* 1710, 1711; without locality, *Brandegee* 661.

Zonal distribution: Transition.

6. **Alsine borealis** (Bigel.) Britton, Mem. Torr. Club **5**: 149. 1894.

Stellaria borealis Bigel. Fl. Bost. ed. 2. 182. 1824.

Type locality: White Mountains, New Hampshire.

Range: Alaska to New England, south to California and New Jersey.

Specimens examined: Olympic Mountains, *Piper*, August, 1895; Seattle, *Smith* 231; Tacoma, *Flett* 162; Skokomish Valley, *Kincaid*, May, 1892; upper Nisqually Valley, *Allen* 155; Cascade Mountains, latitude 49°, *Lyall* in 1859; Mount Adams, *Suksdorf* 2302; Falcon Valley, *Suksdorf* 527; Skamania County, *Suksdorf* 2437; Nason Creek, *Sandberg & Leiberg* 605; Cascade Mountains to Colville, *Lyall* in 1860; Spokane, *Watson*, September 24, 1880; Tukanon River, *Lake & Hull* 480; Blue Mountains, *Piper* 2454; without locality, *Brandegee* 662, 664.

Zonal distribution: Transition and Canadian.

6a. **Alsine borealis alpestris** (Fries) Britton, Mem. Torr. Club **5**: 149. 1894.

Stellaria alpestris Fries, Mant. **1**: 10. 1832.

Stellaria borealis corollina Fenzl. in Ledeb. Fl. Ross. **1**: 382. 1842.

Alsine brachypetala (Bong.) Howell, Fl. N. W. Am. 82. 1897.

Type locality: "In humidis alpium Jemtlandiae, Lapponiae, Norwegiae passim."

Range: Alaska to Oregon and the Great Lakes. Europe. Asia.

Specimens examined: Port Orchard, *Piper* 2313; Skamania County, *Suksdorf* 2438, 2439; west Klickitat County, *Suksdorf* 526; Spokane County, *Suksdorf* 1864; without locality, *Brandegee*.

7. **Alsine obtusa** (Engelm.) Rose, Contr. Nat. Herb. **3**: 569. 1896.

Stellaria obtusa Engelm. Bot. Gaz. **7**: 5. 1882.

Type locality: Gunnison River, Colorado.

Range: Washington to British Columbia and Colorado.

Specimens examined: Skokomish River, *Piper*, August, 1895.

8. **Alsine calycantha** (Ledeb.) Rydberg, Mem. N. Y. Bot. Gard. **1**: 145. 1900.

Arenaria calycantha Ledeb. Mem. Acad. St. Petersb. **5**: 534. 1812.

Stellaria calycantha Bong. Mem. Acad. St. Petersb. VI. **2**: 127. 1832.

Alsine simcoei Howell, Fl. N. W. Am. **1**: 83. 1897.

Type locality: "Hab. in Siberia orientali."

Range: Alaska to California. Siberia.

Specimens examined: Mount Rainier, *Piper* 2134; Paradise River, *Allen* 159, 159a; Mount Adams, *Suksdorf* 2302, 2303; Mount Stuart, *Brandegee* 667; Klickitat County, *Howell* 313; Skamania County, *Suksdorf* 2194; Wenache trail, *Brandegee* 668.

Zonal distribution: Arctic.

The Mount Rainier specimens were erroneously referred to *A. uliginosa* (Murr.) Britton, by Howell.[a]

Alsine simcoei Howell differs from *A. calycantha* only in being unusually pubescent.

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[a] Fl. N. W. Am. **1**: 82. 1897.

9. **Alsine crispa** (Cham. & Schlecht.) Holzinger, Contr. Nat. Herb. **3**: 216. 1895.

Stellaria crispa Cham. & Schlecht. Linnaea **1**: 51. 1826.

Type locality: "Unalaschka."

Range: Alaska to California.

Specimens examined: Olympic Mountains, *Piper*, August, 1895; Semiamoo Bay, *Lyall* in 1858; upper Nisqually Valley, *Allen* 156; Skamania County, *Suksdorf* 1863; Falcon Valley, *Suksdorf* 333; Blue Mountains, *Piper*, July, 1896.

Zonal distribution: Transition and Canadian.

The Blue Mountains specimens are not typical, and probably represent a new subspecies.

10. **Alsine washingtoniana** (Robinson) Heller, Cat. N. A. Pl. ed. 2. 4. 1900.

Stellaria washingtoniana Robinson, Bot. Gaz. **25**: 166. 1898.

Type locality: "In alder woods of the upper valley of the Nisqually, upon the slopes of Mount Rainier, Washington." Collected by O. D. Allen.

Specimens examined: Lake Cushman, *Piper* 2238; valley of the Nisqually, *Allen* 157.

Zonal distribution: Canadian.

11. **Alsine jamesiana** (Torr.) Heller, Cat. N. A. Pl. ed. 2. 4. 1900.

Stellaria jamesiana Torr. Ann. Lyc. N. Y. **2**: 169. 1828.

Stellaria jamesii of authors.

Type locality: "Rocky Mountains."

Range: Washington to California and Colorado.

Specimens examined: Mount Stuart, *Sandberg & Leiberg* 818; Wenache Mountains *Whited*, June, 1896; Clealum, *Henderson* 2568.

Zonal distribution: Hudsonian.

8. SAGINA.

Herbage glandular-puberulent	3. *S. ciliata*.
Herbage glabrous.	
Stems slender; leaves scarcely fleshy	1. *S. occidentalis*.
Stems rather stout; leaves fleshy	2. *S. crassicaulis*.

1. **Sagina occidentalis** S. Wats. Proc. Am. Acad. **10**: 344. 1875.

Type locality: "In the valleys and borders of salt marshes from Oregon to San Francisco."

Range: British Columbia to California.

Specimens examined: Olympic Mountains, *Piper*; Seattle, *Smith* 744; *Piper* 470; Coupeville, *Gardner* 47, 48; Mount Rainier, *Piper* 2631, 745; Bridge Creek, *Elmer*.

2. **Sagina crassicaulis** S. Wats. Proc. Am. Acad. **18**: 191. 1883.

Type locality: "On Dillon's Beach, Marin County, California."

Range: Washington to California.

Specimens examined: Port Orchard, *Piper* 2312; Ocosta, *Henderson*, June 26, 1892; Ilwaco, *Henderson*, September, 1885; *Piper* 4996.

The species of this genus are illy defined, and we seriously doubt that *S. crassicaulis* and *S. occidentalis* are really distinct. Alpine forms here referred to the latter have been considered to be *S. linnaei* Presl (*S. saginoides* (L.) Britt.), which, indeed, may be correct.

3. **Sagina ciliata** (Greene).

Alsinella ciliata Greene, Fl. Fran. 126. 1891.

Type locality: "Vicinity of Ione," California.

Range: Washington to California.

Specimens examined: Seattle, in dry soil, *Piper* in 1889.

10. MOEHRINGIA.

Petals longer than the obtusish sepals.............................. 1. *M. lateriflora.*
Petals shorter than the acuminate sepals.......................... 2. *M. macrophylla.*

1. Moehringia lateriflora (L.) Fenzl, Verbr. Alsin. 18. 1833.

Arenaria laterifolia L. Sp. Pl. **1**: 423. 1753.

Type locality: Siberia.

Range: Oregon to Colorado and New Jersey, and northward. Asia.

Specimens examined: Mason County, *Piper* 1022; Rock Lake, *Sandberg & Leiberg* 123; Sprague, *Henderson*, May, 1892; Pullman, *Hull* 483; *Piper*, June, 1893; Walla Walla, *Brandegee* 671.

Zonal distribution: Transition.

2. Moehringia macrophylla (Hook.) Torr. Bot. Wilkes Exped. 246. 1874.

Arenaria macrophylla Hook. Fl. Bor. Am. **1**: 102. 1830.

Type locality: "North-West America, in shady woods." Collected by Douglas.

Range: British Columbia to California and eastward to Lake Superior.

Specimens examined: Clallam County, *Elmer* 2751; Tacoma, *Flett* 87; Mount Rainier, *Piper* 2128; upper Nisqually Valley, *Allen* 158; White Salmon, *Suksdorf* 250; Klickitat River, *Flett* 1356; Clealum, *Whited* 361; Nason Creek, *Sandberg & Leiberg* 627; without locality, *Brandegee* 670; Kamiak Butte, *Moore* 1705; Pend Oreille River, *Lyall* in 1861; Wawawai, *Lake & Hull* 784; Mount Carlton, *Kreager* 219; Cape Horn, *Piper* 5014.

Zonal distribution: Transition to Hudsonian.

AMMODENIA.

1. Ammodenia peploides (L.) Rupr. Beitr. Pfl. Russ. Reich. **2**: 25. 1845.

Arenaria peploides L. Sp. Pl. **1**: 423. 1753.

Honkenya peploides Ehrh. Beitr. **2**: 181. 1788.

Type locality: European.

Range: On the seashore, Arctic regions, southward to Washington and New Jersey. Europe. Asia.

Specimens examined: Shoalwater Bay, *Cooper* in 1854; Bellingham Bay, *Suksdorf* 1867; Ilwaco, *Henderson* 2156; Fidalgo Island, *Lyall* in 1858.

Zonal distribution: Humid Transition.

1a. Ammodenia peploides major (Hook.)

Arenaria peploides major Hook. Fl. Bor. Am. **1**: 102. 1830.

Honkenya oblongifolia Torr. & Gr. Fl. **1**: 176. 1838.

Arenaria sitchensis Dietr. Syn. Pl. **2**: 1565. 1839-52.

Type locality: "De Fuca's Straits." Collected by Scouler.

Range: Alaska to Washington.

Specimens examined: Oyhut, *Lamb* 1248; Whidby Island, *Gardner* 45; near Seattle, *Piper*, July, 1897.

Zonal distribution: Humid Transition.

ARENARIA.

Valves of the capsule 2-toothed.
  Annual; leaves ovate.............................. 1. *A. serpyllifolia.*
  Perennials: leaves very narrowly linear.
    Sepals obtuse; flowers in loose cymes.............................. 2. *A. capillaris.*
    Sepals not obtuse.
      Petals longer than the ovate acute 3-nerved sepals.
        Flowers in dense clusters.............................. 3. *A. congesta.*
        Flowers in loose clusters.............................. 4. *A. glabrescens.*

Petals shorter than the pungent, lanceolate 1-nerved sepals .... 5. *A. franklinii.*
Petals wanting; plants minute, usually purplish .... 8. *A. pusilla.*
Valves of the capsule entire.
Petals present.
Leaves linear or lance-linear; marsh plants with soft and flaccid leaves and stems .... 6. *A. paludicola.*
Leaves subulate or filiform, rather rigid.
Sepals obtuse .... 11. *A. sajanensis.*
Sepals acute or cuspidate.
Plants densely matted or tufted, alpine; cymes few-flowered.
Herbage glandular; sepals not strongly nerved. 10. *A. nuttallii.*
Herbage not glandular; sepals strongly nerved. 9. *A. verna.*
Plants loosely or not at all matted; cymes dichotomously branched, several to many-flowered; lowland plant .... 7. *A. tenella.*

1. **Arenaria serpyllifolia** L. Sp. Pl. **1**: 423. 1753.

TYPE LOCALITY: Europe.

SPECIMENS EXAMINED: Fairhaven, *Piper*, July, 1897; Whidby Island, *Gardner* 369; Seattle, *Piper* 551; Tacoma, *Flett* 2022; Clarke County, *Suksdorf* 1868, 101.

2. **Arenaria capillaris** Poir. Encycl. **6**: 380. 1804.

TYPE LOCALITY: "Dans la Sibérie."

RANGE: British Columbia to California and Utah. Siberia.

SPECIMENS EXAMINED: Cascade Mountains, latitude 49°, *Lyall* in 1860; head of Twisp River, *Whited* 211; Wenache Mountains, *Whited* 1283; Nason Creek, *Sandberg & Leiberg* 681; Horseshoe Basin, *Lake & Hull* 486; without locality, *Brandegee* 674; Mount Carlton, *Kreager* 238; Wenache Mountains, *Cotton* 1187.

ZONAL DISTRIBUTION: Arctic.

2a. **Arenaria capillaris nardifolia** (Ledeb.) Regel, Bull. Soc. Nat. Mosc. **35**: 253. 1830.

Arenaria nardifolia Ledeb. Ic. Fl. Ross. **1**: 4. *pl. 6.* 1829.

TYPE LOCALITY: "Hab. in rupibus alpium Altaicarum."

RANGE: Alaska to California and Utah. Siberia.

SPECIMENS EXAMINED: Olympic Mountains, *Flett* 806; Mount Rainier, *Piper* 620, 2121; *Allen* 238; Mount Stuart, *Elmer* 1115; Klickitat River, *Flett* 1059.

ZONAL DISTRIBUTION: Arctic.

3. **Arenaria congesta** Nutt.; Torr. & Gr. Fl. **1**: 178. 1838.

TYPE LOCALITY: "Shady hills in the Rocky Mountain range, about Bear River of the Lake of Timpanagos." Collected by Nuttall.

RANGE: Washington to California and Colorado.

SPECIMENS EXAMINED: Chelan, *Whited* 1377; Conconully, *Whited* 1320; White Bluff, *Lake & Hull* 485; Wilson Creek, *Lake & Hull* 482; Loon Lake, *Winston*, July 20, 1897; Spokane, *Spaulding; Suksdorf* 252; *Piper*, June, 1897; Blue Mountains, *Lake & Hull*, July, 1892; *Piper*, July, 1896; Clarks Springs, *Kreager* 100.

ZONAL DISTRIBUTION: Arid Transition.

4. **Arenaria glabrescens** (S. Wats.)

Arenaria fendleri glabrescens S. Wats. Bot. King Explor. 40. 1871.

Arenaria fendleri subcongesta S. Wats. loc. cit.

Arenaria burkei Howell, Fl. N. W. Am. 85. 1897.

TYPE LOCALITY: Toyabe Mountains, Nevada.

RANGE: Washington to Alberta, Arizona, and California.

Specimens examined: Upper Wenas River, *Henderson* 2566; Cleman Mountain, *Henderson* in 1892; Ellensburg, *Whited* 666; Coulee City, *Lake & Hull*, August, 1892; junction Crab and Wilson creeks, *Sandberg & Leiberg* 294; Blue Mountains, *Piper*, July, 1896; without locality, *Vasey* in 1889.

Zonal distribution: Arid Transition.

5. **Arenaria franklinii** Dougl.; Hook. Fl. Bor. Am. **1**: 101. 1830.

Type locality: "Abundant on barren sandy plains and undulating grounds of the Columbia, from the 'Great' to the 'Kettle' falls." Collected by Douglas.

Range: Eastern Washington and eastern Oregon.

Specimens examined: Pasco, *Piper* 2970; *Hindshaw* 6; Klickitat County, *Leckenby*, May, 1898; North Yakima, *Henderson*, May, 1892; Morgans Ferry, *Suksdorf* 254; Bickleton, *Suksdorf* 253; Columbia River, latitude 46° to 49°, *Lyall* in 1860; Wilson Creek *Sandberg & Leiberg* 296; Wallula, *Cotton* 1026, 1044.

Zonal distribution: Upper Sonoran.

6. **Arenaria paludicola** Robinson, Proc. Am. Acad. **29**: 298. 1894.

Arenaria palustris S. Wats. Bot. Cal. **1**: 70. 1876, not Gay. 1845.

Alsine palustris Kellogg, Proc. Cal. Acad. Sci. **3**: 61. 1863.

Type locality: San Francisco, California.

Range: Washington to California.

Specimens examined: Near Tacoma, *Flett*, September, 1896.

Zonal distribution: Humid Transition.

7. **Arenaria tenella** Nutt.; Torr. & Gr. Fl. **1**: 179. 1838.

Arenaria stricta β Hook. Fl. Bor. Am. **1**: 99. 1830.

Type locality: "Rocky places, plains of the Oregon." Collected by Nuttall.

Range: British Columbia to Oregon, in the coast region.

Specimens examined: Cascade Mountains, latitude 49°, *Lyall* in 1859; Whidby Island, *Gardner* 46; Tacoma, *Flett* 890, 190; Olympia, *Kincaid*, July, 1896; *Henderson*, May, 1892; Woodlawn, *Henderson*, June, 1892; Steilacoom, *Suckley; Piper;* Columbia River, *Nuttall;* Roy, *Allen*, May 23, 1889; Yelm, *Piper* in 1888; Stuart Island, *Lawrence* 42.

Zonal distribution: Humid Transition.

8. **Arenaria pusilla** S. Wats. Proc. Am. Acad. **17**: 367. 1882.

Type locality: Yreka, California.

Range: Washington and Idaho to California.

Specimens examined: White Salmon, *Suksdorf* 249; Waitsburg, *Horner* 128; Pullman, *Piper* 1885.

Zonal distribution: Arid Transition.

9. **Arenaria verna rubella** (Wahl.) S. Wats. Bibl. Index 99. 1878.

Alsine rubella Wahl. Fl. Lapp. **1**: 28. *pl.* 6. 1812.

Arenaria hirta glabrata Cham. & Schlecht. Linnaea **1**: 56. 1826.

Type locality: "Hab. in summitate alpis Lyngensis Nordlandiae septentrionalis circiter 3,000 pedes paris. supra mare elevata."

Range: Alaska to Greenland, south to Washington and Colorado.

Specimens examined: Mount Rainier, *Piper* 2115; *Smith* 777; *Flett* 228; Olympic Mountains, *Piper*, August, 1895; *Elmer* 2748.

Zonal distribution: Arctic.

Hooker[a] reports *A. verna* from the Columbia, collected by Menzies and by Douglas. Hooker's plant can scarcely be the rare Alpine plant here considered.

Flett's 228 was referred by Wiegand[b] to the scarcely distinct *A. propinqua* Richards.

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[a] Fl. Bor. Am. **1**: 99. 1830.

[b] Bull. Torr. Club **24**: 343. 1897.

10. **Arenaria nuttallii** Pax; Engler's, Bot Jahrb. **18**: 30. 1893.
Arenaria pungens Nutt.; Torr. & Gr. Fl. **1**: 179. 1838, not Clem. 1816.
TYPE LOCALITY: "Summit of hills in the Rocky Mountain range (lat. 41°)."
RANGE: British Columbia to California and Wyoming.
SPECIMENS EXAMINED: Mount Stuart, *Brandegee* 676; *Elmer* 1118; Mount Adams, *Suksdorf* 48; *Howell & Henderson*, August, 1882; *Henderson*, August 10, 1892.
ZONAL DISTRIBUTION: Arctic.

11. **Arenaria sajanensis** Willd. Schlecht. Berl. Gesell. Nat. Fr. Mag. **7**: 200. 1813.
TYPE LOCALITY: "Auf der östlichen Höhen des altaischen Gebirges," Siberia.
Range: Alaska to Greenland, south in the mountains to Arizona. Siberia.
SPECIMENS EXAMINED: Olympic Mountains, *Flett* 805; Cascade Mountains, latitude 49°, *Lyall* in 1860; near Mount Baker, *Flett* 860; Mount Stuart, *Brandegee* 672; *Elmer* 1119; Mount Adams, *Flett* 1353; *Suksdorf* 175; Loomis, *Elmer* 623.
ZONAL DISTRIBUTION: Arctic.
This species appears in Suksdorf's list as "*A. biflora* Wats. var."

SPERGULA.

1. **Spergula arvensis** L. Sp. Pl. **1**: 440. 1753. SPURREY
TYPE LOCALITY: Europe.
SPECIMENS EXAMINED: Pullman, *Hardwick*, July, 1895.

TISSA.

Maritime plants; leaves very fleshy.
  Perennial, large-rooted; flowers large .... 1. *T. macrotheca.*
  Annual, fibrous-rooted; flowers smaller .... 2. *T. marina.*
Not maritime; leaves not fleshy.
  Stipules elongate, silvery .... 3. *T rubra.*
  Stipules short, deltoid.. 4. *T. diandra bracteata.*

1. **Tissa macrotheca** (Hornem.) Britt. Bull. Torr. Club **16**: 129. 1889.
Arenaria macrotheca Hornem.; Cham. & Schlecht. Linnaea **1**: 53. 1826.
Lepigonum macrothecum Fisch. & Mey. Ind. Sem. Hort. Petrop. **3**: 14. 1835. *nom. nud.*
TYPE LOCALITY: "In sabulosis Californiae."
RANGE: Washington to California.
SPECIMENS EXAMINED: Port Angeles, *Piper* 2302 in part; Stuart Island, *Lawrence* 138.
ZONAL DISTRIBUTION: Humid Transition.

2. **Tissa marina** (L.) Britt. Bull. Torr. Club, **16**: 126. 1889.
Arenaria rubra marina L. Sp. Pl. **1**: 423. 1753.
Spergularia salina J. & C. Presl, Fl. Cech. 95. 1819.
TYPE LOCALITY: Europe.
RANGE: Atlantic and Pacific coasts and alkaline places in the interior.
SPECIMENS EXAMINED: Clallam County, *Elmer* 2746; Whidby Island, *Gardner* 363; Seattle, *Piper*, September 4, 1890; *Howell* 372; Port Angeles, *Piper* 2302 in part; Whatcom County, *Suksdorf* 954; 1874, 1872.
ZONAL DISTRIBUTION: Humid Transition.

3. **Tissa rubra** (L.) Britt. Bull. Torr. Club **16**: 127. 1889.
Arenaria rubra L. Sp. Pl. **1**: 423. 1753.
Spergularia rubra J. & C. Presl, Fl. Cech. 94. 1819.
TYPE LOCALITY: Europe.
RANGE: British Columbia to California. Atlantic States. Europe.
SPECIMENS EXAMINED: Clallam County, *Elmer* 2745; Tacoma, *Flett* 179; Oakesdale, *Piper*, July 19, 1894; Union Flat, *Lake & Hull*, July 18, 1892; Waitsburg, *Horner* 112; Newport, *Kreager* 452.
ZONAL DISTRIBUTION: Transition.

3a. Tissa rubra perennans (Kindb.) Greene, Pittonia **2**: 229. 1892.

Lepigonum rubrum perennans Kindb. Monogr. 41. 1863.

Spergularia rubra perennans Robinson in Gray, Syn. Fl. **1**: 250. 1897.

TYPE LOCALITY: Sweden.

RANGE: Washington and Idaho to California. Europe.

SPECIMENS EXAMINED: Satsop, *Heller* 4026; Kalama, *Piper*, October, 1901; Lake Park, *Piper* 2126; Klickitat County, *Brandegee* 678; west Klickitat County, *Suksdorf* 2081; Stuart Island, *Lawrence* 196.

4. Tissa diandra bracteata (Robinson).

Spergularia salsuginea bracteata Robinson in Gray, Syn. Fl. **1**: 251. 1897.

TYPE LOCALITY: Texas.

RANGE: Washington to California and Texas.

SPECIMENS EXAMINED: West Klickitat County, *Suksdorf* 2082, 176; Egbert Springs *Sandberg & Leiberg* 346.

ZONAL DISTRIBUTION: Upper Sonoran.

PENTACAENA.

1. Pentacaena ramosissima (Weinm.) Hook. & Arn.; Hook. Bot. Misc. **3**: 338. 1833.

Loeflingia ramosissima Weinm. Bot. Zeit. **3**: 608. 1820.

Paronychia? ramosissima DC. Prod. **3**: 372. 1828.

TYPE LOCALITY: "In apricis siccis Chili."

RANGE: Washington to California. Chile.

SPECIMENS EXAMINED: Westport, *Heller* 3939; Oyhut, *Lamb* 1262; Ilwaco, *Piper*.

ZONAL DISTRIBUTION: Humid Transition.

NYMPHAEACEAE. WATERLILY FAMILY.

Leaves peltate; carpels several, 1-seeded	BRASENIA.
Leaves cordate; carpel 1, many-seeded	NYMPHAEA.

BRASENIA.

1. Brasenia schreberi Gmel. Syst. Veg. **1**: 853. 1796. WATERSHIELD.

Hydropeltis purpurea Michx. Fl. **1**: 324. 1803.

Brasenia peltata Pursh, Fl. **2**: 389. 1814.

Brasenia purpurea Casp. in Engl. & Prantl, Nat. Pfl. Fam. **3**^{2}: 6. 1888.

TYPE LOCALITY: None given.

RANGE: British Columbia to Nova Scotia, southward to California, Texas, and Florida. Asia. Australia. Africa.

SPECIMENS EXAMINED: Lake Washington, *Piper*, July, 1895; Silver Lake, *Henderson*, October, 1892; Davis Lake, *Kreager* 443.

ZONAL DISTRIBUTION: Transition.

NYMPHAEA.

1. Nymphaea polysepala (Engelm.) Greene, Bull. Torr. Club **15**: 84. 1888. WOKAS.

Nuphar polysepalum Engelm. Trans. Acad. St. Louis **2**: 282. 1865.

TYPE LOCALITY: "In small lakes, in the higher Rocky Mountains, from the sources of the Platte, near Long's Peak, lat. 40°, to those of the Columbia River, lat. 44°."

RANGE: Alaska to California and Colorado.

SPECIMENS EXAMINED: Oyhut, *Lamb* 1260; Falcon Valley, *Suksdorf* 46; Union Flat, *Lake & Hull* 421; Big Meadows, Stevens County, *Kreager* 426.

ZONAL DISTRIBUTION: Transition to Hudsonian.

The common form of this species has floating leaves, but in some lakes a form occurs in which the leaf blade is held above the water. Forms with the outer sepals red-tinged

(*Nuphar polysepalum pictum* Engelm.) are of frequent occurrence. *Nymphaea advena* has several times been reported from Washington, but it is improbable that that species occurs so far west, the above being mistaken for it.

CERATOPHYLLACEAE.

CERATOPHYLLUM.

1. **Ceratophyllum demersum** L. Sp. Pl. 2: 992. 1753. HORNWORT.

TYPE LOCALITY: Europe.

RANGE: Temperate North America. Europe.

SPECIMENS EXAMINED: Lake Washington, *Piper*, July 12, 1895.

This plant is common in lakes, but is rarely collected. Fruiting specimens are very rare. Good material is a desideratum, as there is some probability that more than one species occurs in Washington.

RANUNCULACEAE. BUTTERCUP FAMILY.

Carpels with solitary ovules; fruit an akene.
  Sepals valvate in the bud; leaves opposite .... CLEMATIS (p. 266).
  Sepals imbricated in the bud; leaves not opposite.
    Cauline leaves three in a whorl.
      Styles short, glabrous or pubescent .... ANEMONE (p. 267).
      Styles long, plumose .... PULSATILLA (p. 268).
    Cauline leaves alternate or leaves all basal.
      Petals none; flowers small, numerous in corymbs or panicles. Leaves ternately decompound...... THALICTRUM (p. 268).
        Leaves simple, palmate .... TRAUTVETTERIA (p. 269).
      Petals present.
        Akenes numerous on an elongate receptacle; flowers solitary on scapes; leaves entire... MYOSURUS (p. 269).
        Akenes in a globose or oblong cluster.
          Flowers white; akenes transversely wrinkled .... BATRACHIUM (p. 270).
          Flowers yellow; akenes not transversely wrinkled .... RANUNCULUS (p. 270).
Carpels with several ovules, in fruit follicles or berries.
  Flowers regular.
    Leaves simple, palmate.
      Petals none; leaves cordate-orbicular .... CALTHA (p. 277).
      Petals linear-spatulate; leaves palmately parted.. TROLLIUS (p. 277).
    Leaves compound.
      Sepals spurred .... AQUILEGIA (p. 278).
      Sepals not spurred.
        Petals large; sepals persistent; flowers solitary. PAEONIA (p. 278).
        Petals small; sepals deciduous.
          Carpels becoming berries; flowers in Racemes .... ACTAEA (p. 278).
          Carpels becoming follicles.
            Follicles stipitate; flowers solitary or umbellate; leaves coriaceous, evergreen .... COPTIS (p. 278).
            Follicles sessile; flowers racemose; leaves membranous, deciduous... CIMICIFUGA (p. 278).
  Flowers irregular.
    Upper sepal spurred; petals 4 .... DELPHINIUM (p. 279).
    Upper sepal hood-like; petals 2 .... ACONITUM (p. 282).

CLEMATIS.

Erect herbs; leaves compound with narrow segments .... 1. *C. hirsutissima.*
Half-woody climbers.
Flowers large, blue, solitary.
Leaves ternate, the leaflets mostly entire .... 2. *C. columbiana.* ✓
Leaves biternate or nearly so .... 3. *C. alpina occidentalis.*
Flowers small, white, panicled.
Akenes pubescent with straight hairs .... 4. *C. ligusticifolia.* ✓
Akenes pubescent with crinkly hairs .... 5. *C. suksdorfii.*

1. **Clematis hirsutissima** Pursh, Fl. **2**: 385. 1814. SUGAR BOWLS.

Clematis douglasii Hook. Fl. Bor. Am. **1**: 1. 1829.

TYPE LOCALITY: "On the plains of the Columbia River." Collected by Lewis.

RANGE: British Columbia to Montana, Oregon, and New Mexico.

SPECIMENS EXAMINED: Waterville, *Whited* 1211; Spokane County, *Suksdorf* 229; Hangman Creek, *Sandberg & Leiberg* 14; Pullman, *Piper* 1450.

ZONAL DISTRIBUTION: Arid Transition.

The leaves of this plant taste like strychnine, and Geyer gives an account of the way the Nez Perce Indians used it to stimulate fagged horses by rubbing it in their nostrils.

2. **Clematis columbiana** (Nutt.) Torr. & Gr. Fl. **1**: 11. 1838.

Atragene columbiana Nutt. Journ. Acad. Phila. **7**: 7. 1834.

Clematis verticillaris columbiana Gray, Syn. Fl. **1**^{1}: 8. 1895.

? *Atragene grosseserrata* Rydberg, Bull. Torr. Club **29**: 156. 1902.

TYPE LOCALITY: "Flathead River." Collected by Wyeth.

RANGE: British Columbia and Alberta to Utah.

SPECIMENS EXAMINED: Spokane, *Henderson*, June, 1892; Mount Carlton, *Kreager* 287, 291; Pend Oreille River, *Lyall* in 1861.

ZONAL DISTRIBUTION: Arid Transition and Canadian.

3. **Clematis alpina occidentalis** (Hornem.) Gray in Powell, Geol. Surv. Dakota 531. 1880.

Atragene occidentalis Hornem. Hort. Havn. 520. 1813.

Clematis pseudoatragene pseudoalpina Kuntze, Verb. Bot. Ver. Brandenburg **26**: 160. 1884.

TYPE LOCALITY: Unknown.

RANGE: Washington to Dakota and New Mexico.

SPECIMENS EXAMINED: Upper Columbia, *Wilkes Expedition* 1095; Swauk Creek Mountains, *Brandegee* 600; Cowlitz Pass, *Tweedy* in 1882.

Doctor Rydberg[a] maintains that Hornemann's name belongs to the plant usually called *Clematis verticillaris columbiana*, and therefore takes up Kuntze's name in the combination *Atragene pseudoalpina* for the above species.

4. **Clematis ligusticifolia** Nutt.; Torr. & Gr. Fl. **1**: 9. 1838.

Clematis ligustifolia brevifolia Nutt. loc. cit.

Clematis brevifolia Howell, Fl. N. W. Am. 8. 1897.

TYPE LOCALITY: "Plains of the Rocky Mountains." Collected by Nuttall.

RANGE: British Columbia and Saskatchewan to California and New Mexico.

SPECIMENS EXAMINED: West Klickitat County, *Suksdorf* 1954; Egbert Springs, *Sandberg & Leiberg* 386; North Yakima, *Watt*, August, 1895; *Henderson*, October, 1892; Parker, *Dunn*, August 8, 1901; Wenache, *Whited* 175, 1333; Spokane, *Henderson*, July, 1892; Wawawai, *Piper* 1455; Wilson Creek, *Lake & Hull* 408; Spokane County, *Suksdorf* 2338; Pullman, *Elmer* 291; without locality, *Vasey* in 1889; Clarks Springs, *Kreager* 122; Prosser, *Cotton* 623.

ZONAL DISTRIBUTION: Upper Sonoran, occasionally Arid Transition.

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[a] Bull. Torr. Club **29**: 155. 1902.

5. **Clematis suksdorfii** Robinson in Gray, Syn. Fl. 1: 4. 1895.
Type locality: Klickitat River, Washington. Collected by Suksdorf.
Range: Known only from the type locality.
Specimens examined: Klickitat River, *Suksdorf* in 1881.

Clematis graveolens Lindl., an Asiatic species, has been collected by Leckenby near Zillah as a garden escape.

ANEMONE.

Akenes densely woolly.
  Leaves hairy, the lobes linear.................................... 1. *A. hudsoniana.*
  Leaves glabrate, the lobes usually cuneate .... 2. *A. drummondii.*
Akenes not woolly.
  Involucral leaves simple .... 3. *A. deltoidea.*
  Involucral leaves 3 to 5-foliolate.
    Flowers 8 to 12 mm. in diameter, white........................ 4. *A. lyallii.*
    Flowers 20 to 35 mm. in diameter.
      Sepals blue... 5. *A. oregana.*
      Sepals white .... 6. *A. quinquefolia.*

1. **Anemone hudsoniana** (DC.) Richards. Bot. App. Frankl. Journ. 741. 1823.
Anemone multifida hudsoniana DC. Syst. 1: 209. 1818.
Type locality: "Ad sinum Hudsonianum."
Range: Alaska to Labrador, south to Arizona, Nebraska, and Maine.
Specimens examined: Olympic Mountains, *Grant* in 1889; *Elmer* 2678; *Flett* 121; Goat Mountain, *Allen* 250; Columbia River, *Douglas* in 1830; Loomis, *Elmer* 566.
Zonal distribution: Hudsonian.

2. **Anemone drummondii** S. Wats. Bot. Cal. 2: 424. 1880.
Anemone baldensis L. err. det. Hook. Fl. Bor. Am. 1: 5. 1829.
Type locality: Sierra County, California.
Range: British Columbia and Alberta to California.
Specimens examined: Olympic Mountains, *Piper* 2007; *Flett* 131; Mount Adams, *Suksdorf*, July 11, 1886; *Flett* 1268; Mount Rainier, *Flett* 2171.
Zonal distribution: Arctic.

3. **Anemone deltoidea** Hook. Fl. Bor. Am. 1: 6. 1829.
Type locality: "In thick shady woods of the Columbia, near its confluence with the sea." Collected by Douglas.
Range: In the coast region, Washington to north California.
Specimens exmained: Roy, *Allen* 81; upper Nisqually Valley, *Allen* 18; Olympia, *Henderson*, May, 1892; Skamania County, *Suksdorf* 2341; Lower Cascades, *Suksdorf*, May 29, 1886; Vancouver, *Piper* 4947; Cape Horn, *Piper* 5005; Eatonville, *Flett* 2214.
Zonal distribution: Canadian.

4. **Anemone lyallii** Britton, Ann. N. Y. Acad. Sci. 6: 227. 1891.
Anemone quinquefolia lyallii Robinson in Gray, Syn. Fl. 1: 13. 1895.
Type locality: Sumas woods, Lower Fraser River, British Columbia. Collected by Lyall.
Range: British Columbia to Oregon, west of the Cascade Mountains.
Specimens examined: Clallam County, *Elmer* 2675; Olympic Mountains, *Henderson* 2046; Silverton, *Bouck* 11a; Klickitat River, *Flett* 1273; Falcon Valley, *Suksdorf* 301; McNeils Island, *Flett* 54; Roslyn, *Whited* 299; Spokane County, *Suksdorf* 1958.
Zonal distribution: Canadian and Transition.

5. **Anemone oregana** A. Gray, Proc. Am. Acad. 22: 308. 1887.
Anemone quinquefolia oregana Robinson in Gray, Syn. Fl. 1: 13. 1895.
Type locality: Hood River, Oregon. Collected by Mrs. Barratt.

RANGE: Washington and Oregon.

SPECIMENS EXAMINED: Klickitat County, *Suksdorf;* Skamania County, *Suksdrof* 2; Falcon Valley, *Suksdorf,* May 9, 1886; Stampede Pass, *Henderson* in 1892; Roslyn, *Whited* 298; Blue Mountains, *Horner* 50; without locality, *Vasey* in 1889.

6. **Anemone quinquefolia** L. Sp. Pl. **1**: 541. 1753.

Anemone piperi Britton, Bull. Torr. Club **29**: 153. 1902.

TYPE LOCALITY: Virginia.

RANGE: British Columbia to New Brunswick, south to Oregon and Georgia.

SPECIMENS EXAMINED: Skokomish Valley, *Kincaid,* May, 1892; Mount Adams, *Henderson* 4; Pend Oreille River, *Lyall* in 1861; foothills of Blue Mountains, *Horner* 51; Mount Carlton, *Kreager* 228, 253; Kamiak Butte, *Elmer* 393; Granville, *Conard* 361; Mount Baldy, *Conard* 263.

ZONAL DISTRIBUTION: Canadian.

The western form of *A. quinquefolia* L. is considered by Doctor Britton a distinct species, but the apparent differences are very slight. Our plant has been referred to as *A. trifolia* L., and it is the basis of the "*A. tetonensis* Porter?" in Suksdorf's list. Horner's 51 has dark purple flowers and may be distinct.

ANEMONE NARCISSIFLORA L. is accredited to Washington by Torrey upon specimens collected at Port Discovery by the Wilkes expedition. The specimen in the National Herbarium is very young but it is not an Anemone. Apparently it is a Ranunculus, possibly an unusual form of *R. occidentalis* Nutt.

PULSATILLA.

1. **Pulsatilla occidentalis** (S. Wats.) Freyn, Deutsch. Bot. Monatss. **8**: 78. 1890.

Anemone occidentalis S. Wats. Proc. Am. Acad. **11**: 121. 1876.

Anemone alpina L. err. det. Hook. Fl. Bor. Am. **1**: 5. 1829.

TYPE LOCALITY: "In the mountains from British Columbia southward to Mount Shasta and Lassen's Peak."

RANGE: British Columbia to California.

SPECIMENS EXAMINED: Clallam County, *Elmer* 2626; Cascade Mountains, latitude 49°, *Lyall* in 1859; Mount Rainier, *Piper* 2006; *Allen* 98; Nason Creek, *Sandberg & Leiberg* 654; Entiat Creek, *Mrs. Howe;* Horseshoe Basin, *Lake & Hull* 407; Bridge Creek, *Elmer* 694; above Lake Chelan, *T. E. Wilcox* in 1883.

ZONAL DISTRIBUTION: Arctic.

THALICTRUM. MEADOW RUE.

Akenes compressed, 2-edged.
  Leaflets thin; inflorescence loose.............................. 1. *T. occidentale.*
  Leaflets rather thick, veiny; inflorescence narrow, close......... 2. *T. venulosum.*
Akenes terete; leaves usually glandular.............................. 3. *T. purpurascens.*

1. **Thalictrum occidentale** A. Gray, Proc. Am. Acad. **8**: 372. 1872.

Thalictrum dioicum oxycarpum Torr. Bot. Wilkes Exped. 212. 1874.

TYPE LOCALITY: Vancouver Island. Collected by Lyall.

RANGE: British Columbia to New Brunswick and Maine, south to California and Wyoming.

SPECIMENS EXAMINED: Clallam County, *Elmer* 2668; Goat Mountain, *Allen* 247; Silverton, *Bouck* 1; Skamania County, *Suksdorf* 2339; Simcoe Mountains, *Howell* 307; Wenache, *Whited* 8; Stevens Pass, *Sandberg & Leiberg* 788; Horseshoe Basin, *Lake & Hull* 405; Pend Oreille River, *Lyall* in 1861; Mount Rainier, *Piper* 2022; Spokane, *Henderson,* June, 1893; Kamiak Butte, *Piper,* July 20, 1899; Palouse City, *Henderson,* July 1892; Blue Mountains, *Piper*, July, 1896; Pullman, *Piper* 1467, June, 1893; without locality, *Brandegee* 601; without locality, *Vasey* in 1889.

ZONAL DISTRIBUTION: Canadian and Hudsonian.

In Hooker's Flora our species was referred to *T. dioicum* L.

2. **Thalictrum venulosum** Trelease, Proc. Bost. Soc. Nat. Hist. **23**: 302. 1886.

TYPE LOCALITY: "British America, Washington Territory, Wyoming, and Colorado."

RANGE: British Columbia to south Dakota, Colorado, and Oregon.

SPECIMENS EXAMINED: Upper Wenas River, *Henderson*, June, 1892; Rock Lake, *Sandberg & Leiberg* 113; Loomis, *Elmer* 599; Pullman, *Lake & Hull* 404; *Piper* 1467.

ZONAL DISTRIBUTION: Arid Transition.

3. **Thalictrum purpurascens** L. Sp. Pl. 1: 546. 1753.

TYPE LOCALITY: "Habitat in Canada."

RANGE: Saskatchewan to Canada, Florida, Arizona, and Washington.

SPECIMENS EXAMINED: Box Canyon, *Kreager* 377.

THALICTRUM POLYCARPUM Wats. This species appears in Suksdorf's list, but no good evidence exists of its occurrence in Washington.

TRAUTVETTERIA.

1. **Trautvetteria grandis** Nutt.; Torr. & Gr. Fl. 1: 37. 1838.

TYPE LOCALITY: "Shady woods of the Oregon." Collected by Nuttall.

RANGE: British Columbia to Idaho and northern California.

SPECIMENS EXAMINED: Clallam County, *Elmer* 2676; Chehalis County, *Lamb* 1198; Mount Rainier, *Piper*, August, 1895; *Flett* 295; upper Valley Nisqually, *Allen* 17; Mount Adams, *Suksdorf* 494; Cascade Mountains near Stampede Tunnel, *Henderson*, July, 1892; Stevens Pass, *Whited* 1467; Nason Creek, *Sandberg & Leiberg* 692; Blue Mountains, *Piper*, July, 1896; without locality, *Vasey* in 1889; Mount Carlton, *Kreager* 257, 197.

ZONAL DISTRIBUTION: Hudsonian and Canadian.

MYOSURUS. MOUSE TAIL.

Carpels prominently beaked; spikes 2 to 6 cm. long............ 1. *M. apetalus.*
Carpels obscurely beaked; spikes elongate.
  Spikes very slender, 10 to 50 cm. long; seeds oblong....... 1a. *M. apetalus lepturus.*
  Spikes stouter and shorter; seeds oval.
    Salt-marsh plant, mainly maritime.................... 3. *M. major.*
    Not of salt marshes................................ 2. *M. minimus.*

1. **Myosurus apetalus** Gay, Fl. Chil. 1: 31. *pl. 1.* 1845.

Myosurus aristatus Benth; Hook. Lond. Journ. Bot. **6**: 458 bis. 1847.

TYPE LOCALITY: "Provincia de Coquimbo." Chile.

RANGE: British Columbia to Arizona and California. Chile. New Zealand.

SPECIMENS EXAMINED: West Klickitat County, *Suksdorf* 492; Ellensburg, *Piper*, May 20, 1897; Pasco, *Hindshaw* 32; Sprague, *Sandberg & Leiberg* 136; Rockland, *Suksdorf* 834; St. Johns, *Piper* 2796; Almota, *Piper* 2789; Pullman, *Piper* 1355; Waitsburg, *Horner* 182.

ZONAL DISTRIBUTION: Arid Transition.

1a. **Myosurus apetalus lepturus** A. Gray, Bull. Torr. Club **13**: 2. 1886.

Myosurus tenellus Greene, Pittonia **3**: 258. 1898.

Myosurus tenellus amphioxys Greene, loc. cit.

TYPE LOCALITY: California.

RANGE: British Columbia to California and Utah.

SPECIMENS EXAMINED: West Klickitat County, *Suksdorf* 2343; Falcon Valley, *Suksdorf*

2346, 493; Mabton, *Cotton* 321; Rockland, *Suksdorf* 1959; Rock Creek, *Piper* 2790; Coulee City, *Piper* 3875; Rock Lake, *Sandberg & Leiberg* 112; Spokane, *Piper* 2283; Hangman Creek, *Sandberg & Leiberg* 3; Waverly, *Suksdorf*, 2342; Pullman, *Elmer* 184; *Piper* 1459.

ZONAL DISTRIBUTION: Arid Transition.

2. **Myosurus minimus** L. Sp. Pl. 1: 284. 1753.

TYPE LOCALITY: European.

RANGE: Washington and California to Illinois and Florida. Europe.

SPECIMENS EXAMINED: West Klickitat County, *Suksdorf* 2344.

3. **Myosurus major** Greene, Pittonia, 3: 257. 1898.

TYPE LOCALITY: Siskyou County, California.

SPECIMENS EXAMINED: Coupeville, *Gardner* 11; Clallam County, *Elmer* 2674; Stuart Island, *Lawrence* 77.

ZONAL DISTRIBUTION: Humid Transition.

BATRACHIUM.

1. **Batrachium aquatile** (L.) Wimm. Fl. Schles. 8. 1841. WATER CROWFOOT.

Ranunculus aquatilis L. Sp. Pl. 1: 556. 1753.

TYPE LOCALITY: Europe.

RANGE: Alaska to California. Europe. Asia.

SPECIMENS EXAMINED: Oyhut, *Lamb* 1261; Tacoma, *Lockenby*, May, 1898; *Flett*, May 9, 1895; White Salmon, *Suksdorf;* Rock Creek, *Sandberg & Leiberg* 90; Walla Walla region, *Brandegee* 606; Pullman, *Elmer* 841; *Hull* 409; Falcon Valley, *Suksdorf* 1960.

ZONAL DISTRIBUTION: Transition to Canadian.

1a. **Batrachium aquatile pantothrix** (Brot.).

Ranunculus pantothrix Brot. Fl. Lusit. 2: 375. 1804.

Ranunculus aquatilis trichophyllus A. Gray, Man ed. 5, 40. 1867.

Ranunculus trichophyllus Chaix.; Vill. Fl. Dauph. 1: 335. 1786, nom. nud.

TYPE LOCALITY: "Circa Conimbricam" in Lusitania.

RANGE: Alaska to Nova Scotia, south to California and Tennessee. Europe. Asia.

SPECIMENS EXAMINED: San Juan Island, *Lyall* in 1858; Cascade Mountains, latitude 49°, *Lyall* in 1859; Parker, *Dunn*, August 8, 1901; Cascade Mountains to Colville, *Lyall* in 1860; Crab and Wilson creeks, *Sandberg & Leiberg* 265; Harrington, *Sandberg & Leiberg* 220; Marshall Junction, *Piper;* Box Canyon, *Kreager* 395; Chewelah, *Kreager* 528; Pend Oreille River, *Lyall* in 1861; Pullman, *Hull* 410.

The form in flowing streams usually has longer and more flaccid leaf-segments. It is *Ranunculus flaccidus* Pers. or *Batrachium flaccidum* (Pers.) Rupr. and is probably worthy of recognition as a subspecies.

1b. **Batrachium aquatile caespitosum** (DC.)

Ranunculus aquatilis caespitosus DC. Prod. 1: 26. 1824.

TYPE LOCALITY: None given.

RANGE: Same as of *B. aquatile*.

SPECIMENS EXAMINED: Spokane, *Piper* 2633, 2943; Waitsburg, *Horner* 41.

RANUNCULUS. BUTTERCUP.

Plants aquatic or subaquatic; leaves finely dissected when submersed, less so when aerial.
  Akenes corky margined; flowers 15 to 25 mm. broad. 1. *R. delphinifolius.*
  Akenes marginless; flowers 7 to 15 mm. broad....... 2. *R. purshii.*

Plants terrestial but often growing in very wet places; leaves never finely dissected.
Akenes thin-walled, the faces nerved; leaves crenate; plant spreading by runners.................................. 22. *R. cymbalaria*.
Akenes not thin-walled nor nerved.
Leaves entire or nearly so.
Stems creeping, rooting from the nodes.
Leaves lanceolate, 2 to 5 cm. long.......... 3. *R. flammula unalaschensis*.
Leaves linear-spatulate, ½ to 2 cm. long..... 3a. *R. flammula reptans*.
Stems erect, not rooting from the nodes.
Plants 30 to 60 cm. high; leaves lanceolate or oblong .... 4. *R. alismaefolius*.
Plants 10 to 25 cm. high.
Leaves oblong-lanceolate.............. 4a. *R. alismaefolius alismellus*.
Leaves cordate or subcordate.......... 6. *R. populago*.
Leaves or some of them lobed or divided.
Faces of the akenes scabrous or muriculate; annuals.
Pubescent; akenes hispid with hooked hairs.. 20. *R. hebecarpus*.
Nearly glabrous; akenes minutely spiny..... 21. *R. muricatus*.
Faces of the akenes smooth or merely pilose; mostly perennials.
Herbage glabrous or nearly so; low species.
Basal leaves 2 to 4 toothed or lobed, rarely entire; cauline 3-cleft or 3-parted....... 7. *R. glaberrimus*.
Basal and cauline leaves all divided.
Annual; leaves 3 to 5-lobed or parted, the lobes crenately incised or cleft; akenes apiculate .... 9. *R. sceleratus*.
Perennials.
Leaves triternately divided, the segments linear or linear-spatulate.... 8. *R. triternatus*.
Leaves roundish in outline 3 to 5-cleft into cuneate divisions; alpine plants.
Head of akenes globose; petals large, showy........................ 10. *R. suksdorfii*.
Head of akenes oblong.
Leaves pubescent; mostly crenate or lobed .... 5. *R. cardiophyllus*.
Leaves glabrous or nearly so; deeply cleft.
Style straight; leaves ciliate, not cordate.................... 11. *R. eschscholtzii*.
Style recurved; leaves cordate, not ciliate................. 12. *R. verecundus*.
Herbage pubescent or hirsute; mostly tall and coarse species.
Beaks of the akenes hooked at tip.
Petals showy; pubescence villous...... 14. *R. occidentalis*.
Petals very small, pale; pubescence hirsute.
Akenes smooth .... 13. *R. bongardii*.
Akenes hispid on the faces.......... 13a. *R. bongardii greenei*.

Beaks of the akenes not hooked at tip.
 Akenes with a short beak.
  Plants decumbent, creeping by stolons; petals showy ...... 17. *R. repens.*
  Plants erect or ascending, not stoloniferous.
   Head of akenes oblong; petals not longer than the sepals.. 15. *R. pennsylvanicus.*
   Head of akenes globose; petals longer than the sepals.
    Herbage smooth or but little hirsute............. 16. *R. oreganus.*
    Herbage very hirsute..... 16a. *R. oreganus macounii*
 Akenes with a long beak.
  Leaf segments rather small, linear to cuneate-obovate, and 2 or 3-lobed or toothed......... 18. *R. orthorhynchus.*
  Leaf segments large, 2 to 6 cm. long, oblong to ovate, cleft and incise...................... 19. *R. platyphyllus.*

1. **Ranunculus delphinifolius** Torr. in Eaton, Man. ed. 2. 395. 1818.

Ranunculus multifidus Pursh, Fl. 2: 736. 1814, not Forst. 1775.

Type locality: None given.

Range: British Columbia to Canada, south to California and North Carolina.

Specimens examined: Rock Creek, *Sandberg & Leiberg* 82; west Klickitat County, *Suksdorf* 2348; Cheney, *Mrs. Tucker* 83.

Zonal distribution: Arid Transition.

1a. **Ranunculus delphinifolius terrestris** (A. Gray).

Ranunculus multifidus terrestris A. Gray, Man. ed. 5. 41. 1872.

Type locality: Ann Arbor, Michigan.

Range: Same as of the species.

Specimens examined: Klickitat County, *Suksdorf.*

2. **Ranunculus purshii** Richards. Bot. App. Frankl. Journ. 741. 1823.

Ranunculus limosus Nutt.; Torr. & Gr. Fl. 1: 20. 1838.

Type locality: "Wooded country from latitude 54° to 64° north."

Range: Alaska to Nova Scotia, south to Washington, New Mexico, and Michigan.

Specimens examined: Cascade Mountains, latitude 49°, *Lyall* in 1859; Whatcom County, *Gardner* 401; Ellensburg, *Whited* 645; Lincoln County, *Henderson* 2369; near Sprague, *Sandberg & Leiberg* 209; Box Canyon, *Kreager* 394; Mission, *Kreager* 494; Valley, *Beattie & Chapman* 2161.

Zonal distribution: Arid Transition.

3. **Ranunculus flammula unalaschensis** (Bess.) Ledeb. Bull. Soc. Nat. Mosc. 34^2: 41. 1861.

Ranunculus unalaschensis Bess. in Ledeb. Fl. Ross. 1: 32. 1841, as synonym.

Ranunculus flammula intermedius Hook. Fl. Bor. Am. 1: 11. 1829.

Ranunculus intermedius Heller, Bull. Torr. Club 25: 580. 1898, not Poir. 1804.

Type locality: Unalaska.

Range: California to Newfoundland and northward.

Specimens examined: Clallam County, *Elmer* 2620; Montesano, *Heller* 3927; Seattle, *Piper*, July 2, 1896; Coupeville, *Gardner* 5; Silverton, *Bouck* 4; Tacoma, *Flett* 883, 34; Manor, *Piper;* Roslyn, *Whited* 471; east base Mount Adams, *Cooper;* Toppenish, *Henderson;* Pend Oreille River, *Lyall;* Spokane, *Piper* 2635; Pullman, *Hull* 415; without locality, *Vasey* in 1889; Usk, *Kreager* 364.

Zonal distribution: Transition and Canadian.

3a. **Ranunculus flammula reptans** (L.) Schlecht.; E. Meyer, Pl. Labr. 96. 1830.
Ranunculus reptans L. Sp. Pl. **1**: 549. 1753.

TYPE LOCALITY: "Habitat in Suecia, Russia, ad ripas lacuum."

RANGE: Alaska to Hudson Bay and south to California, Colorado, and Pennsylvania.

SPECIMENS EXAMINED: Oyhut, *Lamb* 1252; Cascade Mountains, latitude 49°, *Lyall;* Fidalgo Island, *Flett* 2114; Chelan, *Elmer* 490; Lake Chelan, *Lake,* August 13, 1892; Lake Kalispel, *Kreager* 319.

4. **Ranunculus alismaefolius** Geyer; Benth. Pl. Hartw. 295. 1848.

TYPE LOCALITY: "In uliginosis (Bear Valley) montium Sacramenti."

RANGE: British Columbia to California and Colorado.

SPECIMENS EXAMINED: Klickitat County, *Suksdorf;* Pullman, *Elmer* 817; *Piper* 1461; *Hull* 776.

ZONAL DISTRIBUTION: Arid Transition.

Geyer's original specimens were from the "plains of Coeur d'Aleine," Idaho, but the species was first described as above. Dr. E. L. Greene (Erythea **3**: 45. 1895) considers the Rocky Mountain plant distinct from the Californian and names it *R. calthaeflorus.*

4a. **Ranunculus alismaefolius alismellus** A. Gray, Proc. Am. Acad. **7**: 327. 1868.
Ranunculus alismellus Greene, Fl. Fran. 297. 1892.

TYPE LOCALITY: "Lake Tenaya and on Mt. Dana," California.

RANGE: Washington to Wyoming and California.

SPECIMENS EXAMINED: Mount Adams, *Henderson,* August 3, 1892; *Suksdorf* 495; *Howell;* Falcon Valley, *Suksdorf,* June 6, 1886; Klickitat River, *Flett* 1271; Upper Yakima, *Brandegee;* Wenache Mountains, *Cotton* 1183.

ZONAL DISTRIBUTION: Hudsonian.

5. **Ranunculus cardiophyllus** Hook. Fl. Bor. Am. **1**:14. *pl. 5.* 1829.
Ranunculus affinis lasiococcus Torr. Bot. Wilkes Exped. 213. 1874.

TYPE LOCALITY: "From Canada to lat. 55°." Collected by Richardson.

RANGE: British Columbia to Assiniboia and New Mexico.

SPECIMENS EXAMINED: Fort Colville, *Lyall* in 1861; Spokane to Fort Colville, *Wilkes Expedition.*

6. **Ranunculus populago** Greene, Erythea **3**: 19. 1895 (February).
Ranunculus cusickii Jones, Proc. Calif. Acad. II. **5**: 615. 1895.

TYPE LOCALITY: Eagle Creek, Wallowa Mountains, Oregon. Collected by Cusick.

RANGE: Blue Mountains of Washington and Oregon.

SPECIMENS EXAMINED: Blue Mountains, *Horner* 269.

ZONAL DISTRIBUTION: Hudsonian.

7. **Ranunculus glaberrimus** Hook. Fl. Bor. Am. **1**: 12. 1829.

TYPE LOCALITY: "Common on the mountains around the Kettle Falls, and on the Rocky Mountains near the limits of perpetual snow." Collected by Douglas.

RANGE: British Columbia to Dakota, Colorado, and California.

SPECIMENS EXAMINED: Atanum River, *Flett* 1266; Rattlesnake Mountains, *Cotton* 307; Klickitat County, *Suksdorf* 232; Ellensburg, *Whited,* March 28, 1897; Hangman Creek, *Sandberg & Leiberg* 8; without locality, *Brandegee* 611; Walla Walla, *Mrs. Anderson* in 1884; Colville, *Lyall* in 1861; Pullman, *Elmer* 85; *Piper* 1462; Cheney, *Tucker.*

ZONAL DISTRIBUTION: Arid Transition.

8. **Ranunculus triternatus** A. Gray, Proc. Am. Acad. **21**: 370. 1886.

TYPE LOCALITY: "On high hills near Goldendale," Klickitat County, Washington. Collected by Howell.

RANGE: Klickitat County, Washington.

Specimens examined: Near Goldendale, *Howell*, April 20, 1882; Klickitat Hills, *Gorman*, April, 1895.

Zonal distribution: Arid Transition.

9. Ranunculus sceleratus L. Sp. Pl. **1**: 551. 1753.

Ranunculus eremogenes Greene, Erythea **4**: 121. 1896.

Type locality: European.

Range: British Columbia to New Brunswick, Arizona, Kansas, and Florida. Asia. Europe.

Specimens examined: Whidby Island, *Piper;* Fairhaven, *Henderson*, July 2, 1892; Rock Creek, *Piper* 2793; junction Crab and Wilson creeks, *Sandberg & Leiberg* 285; Whidby Island, *Gardner* 4; Admiralty Head, *Piper*, May, 1898; Alma, *Elmer* 547; Coulee City, *Lake & Hull* 413; Meyers Falls, *Kreager;* Stuart Island, *Lawrence* 152.

Zonal distribution: Transition.

10. Ranunculus suksdorfii A. Gray, Proc. Am. Acad. **21**: 371. 1886.

Type locality: Mount Adams, Washington, in damp ground at 6,000 to 7,000 feet altitude. Collected by Suksdorf.

Range: Washington and Oregon.

Specimens examined: Olympic Mountains, *Henderson* 1846; Mount Rainier, *Allen* 97; *Piper* 2005; Mount Adams, *Suksdorf* 234, 628; Stevens Pass, *Sandberg & Leiberg* 766.

Zonal distribution: Arctic.

11. Ranunculus eschsholtzii Schlect. Ranunc. **2**: 16. 1820.

Type locality: "Hab. in insulis Unalaschka et St. Georgii." Collected by Chamisso.

Range: Alaska to Colorado and California.

Specimens examined: Olympic Mountains, *Piper* 2004; Baldy Peak, *Lamb* 1361; Cascade Mountains, latitude 49°, *Lyall* in 1860; Mount Stuart, *Brandegee* 609; *Elmer* 1215; Mount Adams, *Suksdorf* 92; Horseshoe Basin, *Lake & Hull* 775; Stevens Tass, *Sandberg & Leiberg* 769.

Zonal distribution: Arctic.

12. Ranunculus verecundus Robinson, sp. nov.

Herba parva perennis ½ dm. alta; radice e fibris numerosis fuscis longis haud incrassatis composita; caudice erecto a basibus petiolorum latiusculis pallidis submembranaceis deinde in fibris dissolutis amplecto; caulibus ⅓ suberectis vel valde nutantibus vel etiam procumbentibus saepius semel ramosis; foliis radicalibus paucis vel saepius sate numerosis, limbo reniformi vel suborbiculari conspicue cordato tripartito 2–2.5 cm. lato utrinque glabro, segmentis 3–5-lobatis vel profunde crenatis, lobis oblongis obtusis vel rotundatis, petiolo 2–4 cm. longo glabro vel sparse villosulo basi membranaceo-expanso; foliis caulinis 1–3 distantibus breviter petiolatis fere ad basin 3–5-partitis, segmentis lineari-oblongis vel angustissime ellipticis; peduneulis teretibus glabris 3–7 cm. longis; sepalis 5 concavis suborbicularibus purpurascentibus dorso pubescentibus apice rotundatis margine pallescentibus 2–4 mm. longis; petalis obovatis sepala aequantibus vel vix superantibus flavis sed in specimine exsiccato albescentibus venosis persistentibus; staminibus numerosis, antheris flavibus quam filamenta filiformia brevioribus; achaeniis numerosis in capitulo ovoideo vel breviter cylindrico congestis glabris a latere compressis 1.8 mm. longis obovoideis apice stylo brevi recurvato coronatis; receptaculo ellipsoideo vel subcylindrico foveolato albescenti praeter apicem villosulum glaberrimo.

Washington: Wet gravelly places, Mount Paddo (Adams), altitude 1,850–2,150 meters, July 31, 1883, *W. N. Suksdorf* 93 (type, in Hb. Gray); same locality and collector, August 30, 1904; rocky ridges and ledges, Mount Rainier, altitude 2,300 meters, *J. B. Flett* 2177. Montana: Little Belt Mountains, altitude 2,600 meters, *F. L. Scribner*, August 12, 1883, 4 (Hb. Gray).

From its nearest allies, this species may be distinguished as follows: From *R. eschscholtzii* Schlecht. it differs in its decidedly cordate scarcely or not at all ciliate leaves, and larger achenes with relatively shorter strongly recurved style. From *R. pedatifidus* J. E. Sm. (*R. affinis* R. Br.) it differs in its glabrous achenes and less deeply and narrowly cleft foliage. From *R. alpeophilus* A. Nelson it may be distinguished by its cordate leaves and by the fact that the receptacle is villous only at the tip. Finally from *R. allenii* Robinson, a plant of Labrador which in many ways it rather closely simulates, it differs in its cordate leaves and somewhat larger achenes.

13. **Ranunculus bongardi** Greene, Erythea **3**: 54. 1895.

Ranunculus tenellus Nutt.; Torr &. Gr. Fl. **1**: 23. 1838, not Viviani 1831.

Ranunculus nelsonii tenellus A. Gray, Proc. Am. Acad. **8**: 374. 1872.

Ranunculus occidentalis tenellus A. Gray, Proc. Am. Acad. **21**: 373. 1886

Ranunculus bongardi tenellus Greene, Erythea **3**: 54. 1895.

Ranunculus douglasii Howell, Fl. N. W. Am. **1**: 18. 1897.

Ranunculus arcuatus Heller, Bull. Torr. Club **24**: 310. 1897.

Ranunculus bongardii douglasii Davis, Minn. Bot. Stud. **2**: 479. 1900.

TYPE LOCALITY: "Shady woods of the Oregon and Wahlamet Rivers." Collected by Nuttall.

RANGE: Alaska to Idaho and California.

SPECIMENS EXAMINED: Clallam County, *Elmer* 2672, 2679; Admiralty Head, *Piper*, April, 1898; Tacoma, *Flett* 38; Silverton, *Bouck* 52a; west Klickitat County, *Suksdorf*, May 20, 1886; Klickitat River, *Flett* 1272; Roslyn, *Whited* 409; Rock Creek, *Sandberg & Leiberg* 95; Spokane, *Dewart*, May 3, 1901; Pullman, *Elmer* 847; *Hull* 411; *Piper*, May 31, 1894; Waitsburg, *Horner* 43.

ZONAL DISTRIBUTION: Transition and Canadian.

This and the following were erroneously referred in older works to *R. recurvatus* Poir.

13a. **Ranunculus bongardi greenei** (Howell).

Ranunculus greenei Howell, Fl. N. W. Am. **1**: 18. 1897.

Ranunculus occidentalis lyalli A. Gray, Proc. Am. Acad. **21**: 373. 1886, not *R. lyalli* Hook. f. 1864.

Ranunculus tenellus lyalli Robinson in Gray, Syn. Fl. 1^1: 33. 1895.

?*Ranunculus occidentalis parviflorus* Torr. Bot. Wilkes Exped. 214. 1874.

TYPE LOCALITY: Pend Oreille River, Idaho or Washington, near latitude 49°. Collected by Lyall.

RANGE: Alaska to California and Idaho.

SPECIMENS EXAMINED: Lake Washington, *Suksdorf* 951; Cascade Mountains, latitude 49°, *Lyall* in 1859; Port Ludlow, *Binns*; Admiralty Head, *Piper*, May, 1898; Silverton, *Bouck* 52; Hoquiam, *Lamb* 1029, 1071; Seattle, *Piper* 223; Nisqually Valley, *Allen* 62, *Piper*, July 30, 1895; Tacoma, *Flett* 39; Roy, *Brodie*, June, 1901; Olympia, *Henderson* 2372; Lower Cascades, *Suksdorf*; Pend Oreille River, latitude 49°, *Lyall* in 1861; Clarks Springs, *Kreager* 58; Blue Mountains, *Piper*, July 16, 1896; *Horner* 45.

ZONAL DISTRIBUTION: Transition and Canadian.

14. **Ranunculus occidentalis** Nutt.; Torr. & Gr. Fl. **1**: 22. 1838.

Ranunculus tenuipes Heller, Muhlenbergia **1**: 50. 1904.

TYPE LOCALITY: "Plains of the Oregon River, near woods." Collected by Nuttall.

RANGE: British Columbia to Oregon in the coast region.

SPECIMENS EXAMINED: Near Montesano, *Heller* 3935; Humptulips, *Lamb* 1186; Whidby Island, *Gardner* 3; Tacoma, *Flett* 20; west Klickitat County, *Suksdorf*; Vancouver, *Piper* 4947.

ZONAL DISTRIBUTION: Humid Transition.

15. **Ranunculus pennsylvanicus** L. f. Suppl. 272. 1781.

TYPE LOCALITY: "Habitat in Pennsylvania."

RANGE: British Columbia to Nova Scotia, southward to Arizona and Georgia.

SPECIMENS EXAMINED: Whatcom County, *Gardner;* Puyallup, *Piper*, August 26, 1897; Alma, *Elmer* 542; Fort Colville, *Geyer* 580; McCloud Lake, *Suksdorf* 2213.

ZONAL DISTRIBUTION: Transition.

16. Ranunculus oreganus (A. Gray) Howell, Fl. N. W. Am. **1**: 19. 1897.

Ranunculus hispidus oregana A. Gray, Proc. Am. Acad. **21**: 376. 1886.

Ranunculus macounii oreganus Davis, Minn. Bot. Stud. **2**: 469. 1900.

Ranunculus nitidus Ell. err. det. Hook. Fl. Bor. Am. **1**: 20. 1829.

TYPE LOCALITY: "Shady and wet grounds, Oregon, on the Columbia."

RANGE: British Columbia to Oregon in the coast region.

SPECIMENS EXAMINED: Near Montesano, *Heller* 3850; Klickitat County, *Suksdorf* 233, May 20, 1886.

ZONAL DISTRIBUTION: Humid Transition.

16a. Ranunculus oreganus macounii (Britton).

Ranunculus macounii Britton, Trans. N. Y. Acad. Sci. **12**: 3. 1892.

Ranunculus hispidus Michx. err. det. Hook. Fl. Bor. Am. **1**: 19. 1830.

TYPE LOCALITY: "Banks of rivers from Canada to near the mouth of the Mackenzie River, lat. 67°; and from the shores of Hudson's Bay to the Pacific."

RANGE: British Columbia to Canada, southward in the mountains to New Mexico.

SPECIMENS EXAMINED: Falcon Valley, *Suksdorf*, June 26, 1886; Cheney, *Tucker* 43; Sprague, *Sandberg & Leiberg* 152; Wilbur, *Henderson*, July 12, 1892; Ellensburg, *Whited* 475; Spokane, *Piper*, July 2, 1896; Marshall Junction, *Piper* 2261; Pullman, *Piper* 3526; Waitsburg, *Horner* 42; Loon Lake, *Beattie & Chapman* 2066.

ZONAL DISTRIBUTION: Arid Transition.

17. Ranunculus repens L. Sp. Pl. **1**: 554. 1753.

TYPE LOCALITY: European.

SPECIMENS EXAMINED: Black River Junction, *Piper*.

18. Ranunculus orthorhynchus Hook. Fl. Bor. Am. **1**: 21. 1829.

TYPE LOCALITY: "Not unfrequent on the low points of land near rivers, in North-West America." Collected by Douglas.

RANGE: British Columbia to Oregon in the coast region.

SPECIMENS EXAMINED: New London, *Lamb* 1202; Whidby Island, *Gardner* 1, 8; Seattle, *Piper* 1126; Tacoma, *Flett*, May 5, 1895; Falcon Valley, *Suksdorf*, June 26, 1886; Manor, *Piper*, July 14, 1899.

ZONAL DISTRIBUTION: Humid Transition.

19. Ranunculus platyphyllus (A. Gray).

Ranunculus orthorhynchus platyphyllus A. Gray, Proc. Am. Acad. **21**: 377. 1886.

Ranunculus maximus Greene, Bull. Torr. Club **14** : 118. 1887.

TYPE LOCALITY: "In wet places, Wasatch Mountains and Idaho to E. Oregon and California south to Marin County."

RANGE: British Columbia to California and Nevada.

SPECIMENS EXAMINED: Klickitat County, *Suksdorf;* Klickitat River, *Flett* 1270; Pullman, *Piper* 1463; *Elmer* 838; *Hull* 414.

ZONAL DISTRIBUTION: Arid Transition.

All Washington references to *Ranunculus septentrionalis* Poir. really refer to ***R. platyphyllus***.

20. Ranunculus hebecarpus Hook. & Arn. Bot. Beech. 316. 1840.

Ranunculus hebecarpus pusillus Brewer & Wats. Bot. Cal. **1**: 9. 1876.

TYPE LOCALITY: California.

RANGE: Washington and Idaho to California.

SPECIMENS EXAMINED: White Salmon, *Suksdorf* 228; Wawawai, *Elmer* 75; *Piper* 3821.

ZONAL DISTRIBUTION: Upper Sonoran.

21. Ranunculus muricatus L. Sp. Pl. **1**: 555. 1753.

TYPE LOCALITY: Europe.

SPECIMENS EXAMINED: Seattle, *Piper* in 1885.

22. Ranunculus cymbalaria Pursh, Fl. **2**: 392. 1814.

TYPE LOCALITY: "In saline marshes near the salt works of Onondaga, New York."

RANGE: Alaska to California and New Jersey. Central and South America. Asia.

SPECIMENS EXAMINED: Seattle, *Piper*, September, 1898; Port Ludlow, *Binns;* Yakima, *Leckenby*, May 9, 1898; North Yakima, *Henderson*, May 29, 1892; Rattlesnake Mountains, *Cotton* 414; between Coulee City and Waterville, *Spillman*, May, 1896; Sprague, *Sandberg & Leiberg* 135; Prosser, *Cotton* 653.

ZONAL DISTRIBUTION: Upper Sonoran and Transition.

CALTHA.

Flowers yellow; stems decumbent .... 1. *C. asarifolia.*
Flowers white; stems erect.
  Leaves reniform-orbicular, crenate .... 2. *C. biflora.*
  Leaves cordate, longer than broad .... 3. *C. leptosepala.*

1. Caltha asarifolia DC. Syst. **1**: 309. 1823. MARSH MARIGOLD.

TYPE LOCALITY: "Hab. in insula Ounalaschka una ex ins. Aleuterianis."

RANGE: Alaska to Oregon along the coast.

SPECIMENS EXAMINED: Granville, *Conard* 367.

ZONAL DISTRIBUTION: Canadian?

This seems fairly distinct from the eastern *C. palustris* L.

2. Caltha biflora DC. Syst. **1**: 310. 1818.

Caltha malvacea Greene, Pittonia **4**: 75. 1899.

TYPE LOCALITY: "In ora occidentali Americae borealis in continente prope insulam Banksii." Collected by Menzies.

RANGE: Alaska to Washington.

SPECIMENS EXAMINED: Olympic Mountains, *Piper*, August, 1895; *Elmer* 2780; Mount Adams, *Suksdorf* 496; Yakima Pass, *Watson* 16; without locality, *Vasey* in 1889.

ZONAL DISTRIBUTION: Arctic.

3. Caltha leptosepala DC. Syst. **1**: 310. 1818.

Caltha macounii, Greene, Pittonia **4**: 77. 1899.

Caltha howellii Greene, op. cit. 79.

TYPE LOCALITY: Prince Williams Sound, Alaska. Collected by Menzies.

RANGE: Alaska to Oregon and Colorado.

SPECIMENS EXAMINED: Cascade Mountains, latitude 49°, *Lyall*; Mount Rainier, *Piper* 2001, *Flett* 251; Mount Adams, *Suksdorf* 74; Cascade Mountains, *Henderson*, August, 1892; Goat Mountain, *Allen* 147; Horseshoe Basin, *Lake & Hull* 406; *Elmer* 731.

ZONAL DISTRIBUTION: Arctic.

TROLLIUS.

1. Trollius laxus Salisb. Trans. Linn. Soc. **8**: 303. 1807. GLOBE FLOWER.

Trollius laxus albiflorus A. Gray, Am. Journ. Sci. II. **33**: 241. 1862.

TYPE LOCALITY: "Prope Lancaster in Pennsylvania."

RANGE: British Columbia to New Hampshire, south to Washington, Utah, and Delaware.

SPECIMENS EXAMINED: Olympic Mountains, *Flett* 96; *Elmer* 2668; *Piper*, August, 1895; Cascade Mountains, latitude 49,° *Lyall* in 1860; Wenache, *Elmer* 439; without locality, *Vasey* in 1889; Wenache Mountains, *Cotton* 1241.

ZONAL DISTRIBUTION: Hudsonian.

ACTAEA.

1. **Actaea spicata arguta** (Nutt.) Torr. Pac. R. Rep. **4**: 63. 1856. BANEBERRY.

Actaea arguta Nutt.; Torr. & Gr. Fl. **1**:35. 1838.

Actaea eburnea Rydberg, Mem. N. Y. Bot. Gard. **1**: 153. 1900.

TYPE LOCALITY: "Woods of the Oregon and its tributary streams." Collected by Nuttall.

RANGE: Alaska to Montana, California and New Mexico.

SPECIMENS EXAMINED: Clallam County, *Elmer* 2664; Seattle, *Piper*, July, 1895; Silverton, *Bouck* 5; Lakeview, *Henderson*, July 1892; without locality, *Brandegee* 617; without locality, *Vasey* 164; Lake Chelan, *Lake & Hull* 416; Spokane, *Piper*, July, 1896; without locality, *Henderson*, June, 1892; Blue Mountains, *Horner* 270; Clarks Springs, *Kreager* 127; Mount Carlton, *Kreager* 292, 297.

ZONAL DISTRIBUTION: Humid Transition and Canadian.

The fruit of this species is usually scarlet, but white-berried forms occur, distinguishable by no other character.

COPTIS. GOLDTHREAD.

Leaflets large, 5 to 8 cm. long, obscurely 3-lobed.................... 1. *C. occidentalis*.
Leaflets smaller, 3-parted and incised................................ 2. *C. laciniata*.

1. **Coptis occidentalis** (Nutt.) Torr. & Gr. Fl. **1**: 28. 1838.

Chrysocoptis occidentalis Nutt. Journ. Acad. Phila. **7**: 8. 1834.

TYPE LOCALITY: Rocky Mountains in North Idaho or West Montana. Collected by Wyeth.

RANGE: Idaho and adjacent Washington.

SPECIMENS EXAMINED: Pend Oreille River, *Lyall* in 1861; Ione, *Kreager* 401; Newport, *Piper* 4213.

ZONAL DISTRIBUTION: Canadian and Arid Transition.

2. **Coptis laciniata** A. Gray, Bot. Gaz. **12**: 297. 1887

TYPE LOCALITY: Oregon. Collected by Hall.

RANGE: Washington to northern California.

SPECIMENS EXAMINED: Wind River, *Flett* 1297.

CIMICIFUGA.

1. **Cimicifuga elata** Nutt.; Torr. & Gr. Fl. **1**: 36. 1838.

TYPE LOCALITY: "Shady woods of the Oregon." Collected by Nuttall.

RANGE: Washington and Oregon in the coast region.

SPECIMENS EXAMINED: Clallam County, *Elmer* 2662; Mashel Mountain, *Piper* in 1888; Skamania County, *Suksdorf* 1990; near Vancouver, *Piper* 3502.

ZONAL DISTRIBUTION: Canadian.

PAEONIA.

1. **Paeonia brownii** Dougl.; Hook. Fl. Bor. Am. **1**: 27. 1829.

TYPE LOCALITY: "Near the confines of perpetual snow on the subalpine range of Mount Hood," Oregon. Collected by Douglas in 1826.

RANGE: Washington to Utah and California.

SPECIMENS EXAMINED: Columbia Valley, *Lyall* in 1860; Falcon Valley, *Suksdorf* 329; Peshastin, *Sandberg & Leiberg* 497, Leavenworth, *Savage* 45; Blue Mountains, *Piper* 2424; without locality, *Vasey* in 1889.

ZONAL DISTRIBUTION: Hudsonian or Canadian.

AQUILEGIA. COLUMBINE.

Flowers scarlet and yellow.. 1. *A. formosa*.
Flowers wholly yellow .... 2. *A. flavescens*.

1. **Aquilegia formosa** Fisch.; DC. Prod. **1**: 50. 1824.

Aquilegia columbiana Rydberg, Bull. Torr. Club, **29**: 145. 1902.

TYPE LOCALITY: "In Kamchatka."

RANGE: Alaska to California and Utah.

SPECIMENS EXAMINED: Clallam County, *Elmer* 2671; Montesano, *Heller* 3936; Humptulips, *Lamb* 1180; Cascade Mountains, latitude 49°, *Lyall;* Goat Mountains, *Allen* 249; Silverton, *Bouck* 9; Egbert Springs, *Sandberg & Leiberg* 385; without locality, *Vasey* in 1889; Fish Lake, *Dunn*, August 8, 1900; Cold Creek, *Cotton* 395; Ellensburg, *Elmer* 409, *Whited* 714; Wenache Mountains, *Whited* 1299; Gilberts Mining Claim, *Whited* 45, 153; Horseshoe Basin, *Lake & Hull* 403; Wilson Creek, *Lake & Hull*, August, 1892; Wilbur, *Henderson*, July, 1892; Fresh Lake, *McKay* 28; Loomis, *Elmer* in 1897; Blue Mountains, *Piper*, August, 1896; *Lake & Hull*, July, 1892.

This species has great altitudinal range occurring from sea level up to 1,800 meters altitude. It also occurs in eastern Washington in the Upper Sonoran zone. Such plants are usually finely puberulent throughout and perhaps constitute a good subspecies.

2. **Aquilegia flavescens** S. Wats. Bot. King. Explor. 10. 1871.

TYPE LOCALITY: "Wahsatch and Uintah Mountains, Utah; 5-7,000 feet altitude."

RANGE: British Columbia to Utah and Montana.

SPECIMENS EXAMINED: Silverton, *Bouck* 8; Swauk Creek, *Brandegee* 614; Wenache Mountains, *Elmer* 446; Mount Baldy, *Cotton* 1702; Chewaukum, *Whited* 2533.

ZONAL DISTRIBUTION: Hudsonian.

So far as northwestern specimens are concerned *A. flavescens* is a mere subspecies of *A. formosa*, all intergrades occurring between them. In some places the two grow together and then merge in all particulars.

DELPHINIUM. LARKSPUR.

- Roots fasciculate, elongated, not tuberlike.
  - Pedicels usually shorter than the flowers and fruit; plants about 1 meter high.
    - Inflorescence densely short-villous; flowers greenish.................................. 2. *D. viridescens.*
    - Inflorescence not villous; flowers blue.
      - Leaf divisions narrow; whole plant puberulent; flowers bright blue................ 1. *D. scopulorum stachydeum.*
      - Leaf divisions broad, glaucous beneath, glabrous; flowers dull blue............ 1b. *D. scopulorum glaucum.*
  - Pedicels longer than the flowers and fruit; plants 30 to 60 cm. high.
    - Flowers blue; inflorescence not glandular..... 3. *D. bicolor*
    - Flowers ochroleucous; inflorescence glandular. 4. *D. xantholeucum.*
- Roots thickened, forming irregular tubers.
  - Pedicels ascending or spreading, longer than the flowers and fruit.
    - Mature follicles widely recurving............. 5. *D. menziesii.*
    - Mature follicles contiguous or spreading only at the tips.
      - Stems tall, leafy; leaf segments cleft into narrow lobes; flowers 10 to 20......... 6. *D. columbianum.*
      - Stems low, few leaved; leaves pedately parted; flowers few.................... 7. *D. depauperatum.*
  - Pedicels erect or ascending, short, the inflorescence spike-like.................................. 8. *D. simplex.*

1. **Delphinium scopulorum stachydeum** A. Gray, Bot. Gaz. **12**: 52. 1887.
Type locality: "Interior of Oregon." Collected by Cusick.
Range: Washington to New Mexico and Arizona.
Specimens examined: Wenache Mountains, *Whited* 1264.

1a. **Delphinium scopulorum subalpinum** A. Gray, Bot. Gaz. **12**: 52. 1887.
Type locality: "Headwaters of Clear Creek, Colorado."
Range: Blue Mountains to Colorado and New Mexico.
Specimens examined: Blue Mountains, *Horner* 267; *Piper* 2442.
Zonal distribution: Hudsonian.

1b. **Delphinium scopulorum glaucum** A. Gray, Bot. Gaz. **12**: 52. 1887.
Delphinium glaucum Wats. Bot. Cal. **2**: 427. 1880.
Type locality: "Big Tree Road," California. Collected by Brewer.
Range: Alaska to California.
Specimens examined: Olympic Mountains, *Piper*, August, 1895; *Elmer* 2677; Mount Rainier, *Piper*, August, 1888; Nisqually Valley, *Allen* 248; Yakima County, *Brandegee* 615.
Zonal distribution: Hudsonian.

2. **Delphinium viridescens** Leiberg, Proc. Biol. Soc. Wash. **11**: 39. 1897.
Type locality: Near Peshastin, Washington.
Range: Chelan County, Washington.
Specimens examined: Wenache Valley, *Sandberg & Leiberg* 563; Leavenworth, *Whited* 2556.
Zonal distribution: Canadian.

3. **Delphinium bicolor** Nutt. Journ. Acad. Phila. **7**: 10. 1834.
Delphinium glareosum Greene, Pittonia **3**: 257. 1896.
Delphinium bicolor glareosum Davis, Minn. Bot. Studies, **2**: 439. 1900.
Type locality: "On dry hills, near Flathead or Sailish River, toward the south sources of the Columbia." Collected by Wyeth.
Range: British Columbia to Utah and Montana.
Specimens examined: Goat Mountain, *Allen* 146; Olympic Mountains, *Piper*, August, 1895; *Elmer* 2665; *Flett* 81.

4. **Delphinium xantholeucum** sp. nov.

Perennial from thick elongate black roots 5 to 10 cm. long; stems 60 to 80 cm. high, glabrous and glaucous up to the inflorescence; leaf blades orbicular in outline, thickish, glabrous and glaucous, 2 to 8 cm. broad, parted nearly to the base into 5 cuneate segments, these deeply 2 to 3-cleft into linear lobes; petioles glabrous and glaucous, 2 to 3 times as long as the blades; bracts narrowly linear, or the lowest cuneate and 2 or 3-cleft; inflorescence viscid-pubescent, very loose, 15 to 40 cm. long; pedicels curved, spreading, the lower 5 cm. or more long; flowers pale yellow, the sepals greenish and viscid pubescent outside; sepals and petals 10 to 12 mm. long, the stout straight spur 15 mm. long; lateral petals white-bearded; filaments blue-veined; follicles 3, straight, erect, reticulate-veined, hairy, 10 to 15 mm. long; seeds dark-colored, the angles produced into white scarious wings.

Related to *D. bicolor* Nutt., but a larger plant, with constantly pale yellowish flowers, and the whole inflorescence viscid-pubescent even to the pods.

Collected by Kirk Whited at Wenache, Wash., May 14, 1899, in flower; May 24, 1899, in fruit; also by G. R. Vasey in 1889, no locality indicated.

5. **Delphinium menziesii** DC. Syst. **1**: 355. 1818.
Delphinium pauperculum Greene, Pittonia **1**: 284. 1889.
Type locality: "Hab. in Nova-Georgia." Collected by Menzies.
Range: British Columbia to California and Idaho.
Specimens examined: Whidby Island, *Gardner* 9; Drayton Harbor, *Lyall*, May 3, 1858; Cascade Mountains, latitude 49°, *Lyall* in 1859; Kickitat River, *Flett* 1269; Falcon Valley,

Suksdorf, May 10, 1886; west Klickitat County, *Suksdorf*, May 11, 1886; Mount Adams, *Suksdorf*, July 13, 1886; North Yakima, *Leckenby*, April 18, 1898; Ellensburg, *Piper*, May 20, 1897, 2698; *Whited* 306; Sprague, *Henderson*, May 30, 1892; Spokane, *Piper*, May 16, 1896; Hangman Creek, *Sandberg & Leiberg* 27; Colfax, *Henderson*; Pullman, *Elmer* 221; *Piper* 1457; Mount Carlton, *Kreager* 250; Seattle, *Piper* 217; Prosser, *Cotton* 583; Sunnyside, *Cotton* 349.

Zonal distribution: Upper Sonoran and Transition.

6. **Delphinium columbianum** Greene, Erythea **2**: 193. 1894.

Delphinium nuttallii A. Gray, Bot. Gaz. **12**: 51, 54. 1887, not *D. nuttallianum* Pritzel.

Type locality: "Along and near the Columbia River above The Dalles."

Range: British Columbia to Oregon.

Specimens examined: Coupeville, *Gardner*; Clallam County, *Elmer* 2673; Montesano, *Heller* 3879; Cape Horn, *Piper* 4967; Woodlawn, *Henderson*; Olympia, *Kincaid;* Muckleshoot Prairie, *Dr. Ruhn;* Fourth Plain, *Piper* 3071; Klickitat County, *Suksdorf*, June 4, 1886; Falcon Valley, *Suksdorf* 326; Fort Vancouver, *Tolmie;* Clealum, *Whited* 402; without locality, *Howell;* Blue Mountains, *Piper* 2443; Lewis River, cultivated at Pullman, *Piper* 3818; Columbia River, *Nuttall.*

Zonal distribution: Transition.

7. **Delphinium depauperatum** Nutt.; Torr. & Gr. Fl. **1**: 33. 1838.

Delphinium pauciflorum Nutt. loc. cit., not D. Don. 1803.

Delphinium nuttallianum Pritzel, in Walp. Rep. **2**: 744. 1843.

Type locality: "In the shade of pine woods in the Blue Mountains of the Oregon." Collected by Nuttall.

Range: Washington to Colorado and California.

Specimens examined: Stevens Pass, *Sandberg & Leiberg* 785; Mount Carlton, *Kreager* 250.

Zonal distribution: Hudsonian.

8. **Delphinium simplex** Dougl.; Hook. Fl. Bor. Am. **1**: 25. 1829.

Type locality: "On the subalpine range west of the Rocky Mountains near the Columbia, plentiful." Collected by Douglas.

Range: Idaho and adjacent Washington and Oregon.

Specimens examined: West Klickitat County, *Suksdorf*, June 4 and 24, 1886; Klickitat County, *Howell*, June, 1879; Falcon Valley, *Suksdorf* 497; Ellensburg, *Piper* 2740; *Whited* 523; Toppenish, *Henderson* 2374; Loomis, *Elmer* 594; Spangle, *Suksdorf* 235; Spokane, *Piper* June 25, 1897; Spokane County, *Suksdorf* 720; without locality, *Vasey* in 1889; Pullman, *Piper* 3100, 1458; *Hardwick* in 1895.

Zonal distribution: Arid Transition.

8a. **Delphinium simplex distichiflorum** Hook. Lond. Journ. Bot. **6**: 67. 1847.

Delphinium distichum Geyer; Hook. op. cit. 68, as synonym.

Delphinium azureum Michx. err. det. Torr. Bot. Wilkes Exped. 217. 1874.

Type locality: "Grassy stony borders of rivulets, high plains of Spokane and Nez Percez."

Range: Idaho, Eastern Washington, and Eastern Oregon.

Specimens examined: West Klickitat County, *Suksdorf*, June 25, 1886; Klickitat River, *Suksdorf*, July 16, 1886; Glenwood, *Flett* 1267; without locality, *Vasey* in 1889; Tieton River, *Cotton* 449; without locality, *Hilgard* in 1882; Big Meadows, Stevens County, *Kreager* 417.

Zonal distribution: Arid Transition.

ACONITUM.

1. **Aconitum columbianum** Nutt.; Torr. & Gr. Fl. 1: 34. 1838. ACONITE.

Aconitum nasutum Fisch. err. det. Hook. Fl. Bor. Am. 1: 26. 1829.

TYPE LOCALITY: "Springy places on the Oregon below Walla Walla." Collected by Nuttall.

RANGE: British Columbia to California and Arizona.

SPECIMENS EXAMINED: Cascade Mountains, latitude 49°, *Lyall* in 1860; Mount Stuart, *Sandberg & Leiberg* 577; Wenache Mountains, *Whited* 1177; Tieton River, *Cotton* 453; Simcoe Mountains, *Howell* 305; Cascade Mountains, *Mrs. Steinweg* in 1894; Conconully, *Whited* 1310; Okanogan County, *Whited* 224; without locality, *Vasey* in 1889; Hangman Creek, *Suksdorf* 236; Blue Mountains, *Piper* 2416, 2456; *Lake & Hull* 400.

ZONAL DISTRIBUTION: Canadian.

BERBERIDACEAE. BARBERRY FAMILY.

Shrubs; leaves evergreen, pinnate, spiny .... BERBERIS.
Herbs; leaves deciduous, not pinnate nor spiny.
    Leaves ternately compound; flowers panicled .... VANCOUVERIA.
    Leaves 3-parted; flowers spicate .... ACHLYS.

BERBERIS.

Leaflets palmately nerved .... 1. *B. nervosa.*
Leaflets pinnately nerved.
    Leaflets 5 to 11, shining, strongly spinulose .... 2. *B. aquifolium.*
    Leaflets 3 to 7, dull, often glaucous, weakly spinulose .... 3. *B. repens.*

1. **Berberis nervosa** Pursh, Fl. 1: 219. 1814. OREGON GRAPE.

Mahonia glumacea DC. Syst. 2: 21. 1821.

TYPE LOCALITY: Same place as that of *Berberis aquifolium.*

RANGE: British Columbia, Washington, and Oregon. Also local in North Idaho.

SPECIMENS EXAMINED: Clallam County, *Elmer* 2758; near Montesano, *Heller* 3991; Whidby Island, *Gardner* 12; Admiralty Head, *Piper*, April, 1898; Port Ludlow, *Binns;* Tacoma, *Flett* 109; Olympia, *Henderson*, October, 1892; upper Valley Nisqually, *Allen* 136; Roy, *Allen* 77; Lower Cascade Mountains, *Suksdorf;* Peshastin Canyon, *Watson* 25; Railroad Creek, *Elmer*, September, 1897; without locality, *Vasey* in 1889; Chewaukum, *Whited* 2546.

ZONAL DISTRIBUTION: Humid Transition.

2. **Berberis aquifolium** Pursh, Fl. 1: 219. 1814. OREGON GRAPE.

TYPE LOCALITY: "On the great rapids of the Columbia among rocks in rich vegetable soil." Collected by Lewis.

RANGE: British Columbia, Washington, and Oregon.

SPECIMENS EXAMINED: Cascade Mountains, latitude 49°, *Lyall* in 1859; Admiralty Head, *Piper*, May, 1898; Tacoma, *Flett* 73; upper Nisqually Valley, *Allen* 135; Roy, *Allen* 98; Klickitat River, *Flett* 1265; Fort Vancouver, *Tolmie;* White Salmon, *Suksdorf* 231; Wenache Mountains, *Whited*, July 4, 1900; Fort Colville, *Lyall; Watson* 24; Lake Chelan, *Lake & Hull* 422; Spokane, *Henderson*, July, 1892; without locality, *Cooper.*

ZONAL DISTRIBUTION: Humid Transition, rarely Arid Transition.

Pursh's actual type specimen now preserved in the Philadelphia Academy is certainly the plant generally accepted under this name and not the same as *B. repens* Lindl. as has been claimed. Lewis's specimens of this and of *B. nervosa* were collected at the Great Rapids [Cascades] of the Columbia, in which vicinity *B. repens* seems not to occur.

3. Berberis repens Lindl. Bot. Reg. **14:** *pl. 1176.* 1828.

Type locality: A native of the north-western part of North America." Originally collected by Lewis and Clark.

Range: British Columbia to California, Wyoming, and New Mexico.

Specimens examined: Ellensburg, *Whited* 423½; Union Flat, *Piper*, April, 1897; Spokane, *Sandberg & Leiberg* 73; Davis ranch, *Kreager*, July 21, 1902; Pullman, *Beattie*, May 7, 1902; without locality, *Vasey* in 1889.

Zonal distribution: Arid Transition.

VANCOUVERIA.

1. Vancouveria hexandra (Hook.) Morr. & Dec. Ann. Sci. Nat. II. **2:** 351. 1834.

Epimedium hexandra Hook. Fl. Bor. Am. **1:** 30. 1830.

Type locality: "North-West coast of America." Collected by Menzies.

Range: British Columbia to California in the coast region.

Specimens examined: Chehalis County, *Lamb* 247; Nisqually River, *Piper* 2059; *Allen* 66; Olympia, *Kincaid*, July, 1896; Lower Cascades, *Suksdorf*, May 30, 1886; Fort Vancouver, *Dr. T. E. Wilcox*, May, 1883; Manor, *Piper*, July 10, 1899; Cape Horn, *Piper* 5007; Vancouver, *Piper* 4921.

Zonal distribution: Humid Transition and Canadian.

ACHLYS.

1. Achlys triphylla (Smith) DC. Syst. **2:** 35. 1821. Vanilla leaf.

Leontice triphylla Smith, Rees' Cycl. **20:** no. 5. 1812.

Type locality: "On the west coast of North America." Collected by Menzies.

Range: British Columbia to North California in the coast region.

Specimens examined: Clallam County, *Elmer* 2757; Roy, *Allen* 95; upper Nisqually Valley, *Allen* 64; Mason County, *Kincaid*, May, 1892; Marshfield, *Henderson*, June, 1892; Tacoma, *Flett* 62; Olympia, *O. E. Pelton* in 1879; White Salmon, *Suksdorf* 230; without locality, *Vasey* in 1889.

Zonal distribution: Humid Transition.

PAPAVERACEAE. Poppy Family.

Flowers regular.
  Leaves alternate, lobed or dissected.
    Sepals united, funnel-shaped; stigmas not united....... Eschscholzia (p. 283).
    Sepals free; stigmas united............................ Papaver (p. 283).
  Leaves opposite, entire; stigmas free...................... Playstigma (p. 284).
Flowers irregular.
  Outer petals both spurred or gibbous....................... Bikukulla (p. 284).
  Only one petal spurred..................................... Capnoides (p. 284).

ESCHSCHOLZIA.

1. Eschscholzia columbiana Greene, Pittonia **5:** 231. 1905.

Type locality: "Lower Columbia River in Washington." Collected by Suksdorf.

Range: Lower Columbia Valley, Washington and Oregon.

Specimens examined: Klickitat County, *Suksdorf*, said to be native.

The commonly cultivated *E. californica* Cham. is a frequent garden escape, and it is probably such a plant that is recorded in Cooper's list as *Chryseis californica.*

PAPAVER.

1. Papaver argemone L. Sp. Pl. **1:** 506. 1753.

Type locality: European.

Specimens examined: Spokane, *Dewart*, May 20, 1901.

PLATYSTIGMA.

1. **Platystigma oreganum** (Nutt.) Benth. & Hook.; Brewer & Wats. Bot. Cal. 1: 20. 1876.

Meconella oregana Nutt.; Torr. & Gr. Fl. 1: 64. 1838.

TYPE LOCALITY: "Open plains of the Oregon near its confluence with the Wahlamet." Collected by Nuttall.

RANGE: British Columbia to Oregon in the coast region.

SPECIMENS EXAMINED: Whidby Island, *Gardner* 13; Orcas Island, *Lyall* in 1858; Alki Point, *Piper* 1098; Tacoma, *Flett* 80; Klickitat County, *Suksdorf* in 1878.

ZONAL DISTRIBUTION: Humid Transition.

BIKUKULLA.

Inflorescence simple and racemiform.
  Flowers nearly white; corolla divergently 2-spurred .... 1. *B. cucullaria.*
  Flowers pink; corolla saccate at base .... 2. *B. uniflora.*
Inflorescence thyrsoid; flowers pink .... 3. *B. formosa.*

1. **Bikukulla cucullaria** (L.) Millsp. Bull. W. Va. Agr. Exp. Sta. 2: 327. 1892.
DUTCHMAN'S BREECHES.

Fumaria cucullaria L. Sp. Pl. 2: 699. 1753.

Diclytra cucullaria DC. Syst. 2: 108. 1821.

Bicuculla occidentalis Rydberg, Bull. Torr. Club 29: 160. 1902.

TYPE LOCALITY: "Habitat in Virginia, Canada."

RANGE: Washington and Oregon to Nova Scotia, southward to Missouri and North Carolina.

SPECIMENS EXAMINED: Klickitat County, *Suksdorf* 1946; Almota, *Piper* 1876; Waitsburg, *Horner* 118.

ZONAL DISTRIBUTION: Upper Sonoran.

2. **Bikukulla uniflora** (Kellogg) Howell, Fl. N. W. Am. 1: 34. 1897.

Dicentra uniflora Kellogg, Proc. Cal. Acad. Sci. 4: 141. 1870.

TYPE LOCALITY: "At Cisco and at the summit of the Sierra Nevada mountains on the line of the Central Pacific Railroad."

RANGE: Washington to California and Wyoming.

SPECIMENS EXAMINED: Mount Adams, *Suksdorf* 330; *Flett* 1264.

ZONAL DISTRIBUTION: Canadian?

3. **Bikukulla formosa** (Andr.) Coville, Contr. Nat. Herb. 4: 60. 1893.

Fumaria formosa Andr. Bot. Rep. 6: *pl. 393.* 1797?

Diclytra formosa DC. Syst. 2: 109. 1821.

Dielytra formosa G. Don, Hist. Dichl. Pl 1: 140. 1831.

Diclytra saccata Nutt.; Torr. & Gr. Fl. 1: 67. 1838.

TYPE LOCALITY: Not known.

RANGE: British Columbia to California in the coast region.

SPECIMENS EXAMINED: Clallam County, *Elmer* 2816; Seattle, *Smith* 18; *Piper*, May, 1891; Tacoma, *Flett* 64; upper Valley Nisqually, *Allen* 63; Silverton, *Bouck* 13; Horseshoe Basin, *Lake & Hull* 419; Stevens Pass, *Whited* 1438; Kittitas County, *Sandberg & Leiberg* 702; without locality, *Vasey* in 1889.

ZONAL DISTRIBUTION: Humid Transition.

CAPNOIDES.

Flowers pink; leaves very large .... 1. *C. scouleri.*
Flowers yellow; leaves moderate .... 2. *C. aurea.*

1. **Capnoides scouleri** (Hook.) Kuntze, Rev. Gen. Pl. 1: 15. 1891.

Corydalis scouleri Hook. Fl. Bor. Am. 1: 36. 1829.

Corydalis macrophylla Nutt.; Torr. & Gr. Fl. **1**: 69. 1838.

TYPE LOCALITY: "In dark shady woods of North-West America; plentiful near the confluence of the Columbia with the sea." Collected by Scouler and by Douglas.

RANGE: Washington and Oregon in the coast region.

SPECIMENS EXAMINED: Near Montesano, *Heller* 3871; Little Hoquiam River, *Lamb* 1063; Succotash Valley, *Piper*, August, 1895; July, 1895; Skokomish Valley, *Kincaid*, June 1892; upper Valley Nisqually, *Allen* 118; Steilacoom; Ilwaco, *Piper* 4958.

ZONAL DISTRIBUTION: Canadian.

2. **Capnoides aureum** (Willd.) Kuntze, Rev. Gen. Pl. **1**: 14. 1891.

Corydalis aurea Willd. Enum. 740. 1809.

TYPE LOCALITY: "Habitat in Canada."

RANGE: British Columbia to Hudson Bay and New England, southward to Arizona and Texas.

SPECIMENS EXAMINED: Rock Island, *Sandberg & Leiberg* 432; Spokane, *Piper*, May, 1898; Marshall Junction, *Piper*, July, 1896; Wawawai, *Elmer*, June, 1897.

ZONAL DISTRIBUTION: Arid Transition and Upper Sonoran.

BRASSICACEAE. MUSTARD FAMILY.

- Pods indehiscent.
  - Flowers red; pods elongate, cylindric, somewhat constricted .... 28. RAPHANUS (p. 307).
  - Flowers not red; pods orbicular or globose.
    - Pods globose, reticulated; flowers yellow .... 25. NESLIA (p. 306).
    - Pods flattened, orbicular; flowers white.
      - Fruit wingless; pubescence branched........ 26. ATHYSANUS (p. 306).
      - Fruit winged; pubescence simple........... 27. THYSANOCARPUS (p. 306).
- Pods dehiscent, 2-valved, either elongate (siliques) or short (silicles).
  - Pods elongate, therefore siliques.
    - Siliques compressed parallel to the broad partition.
      - Valves nerveless; leaves all petioled.
        - Flowers red; stem 2 or 3-leaved near the summit .... 4. DENTARIA (p. 288).
        - Flowers white; stem leafy below or throughout.......... 5. CARDAMINE (p. 289).
      - Valves 1-nerved; cauline leaves sessile.
        - Siliques lanceolate, the valves reticulate.. 6. PARRYA (p. 291).
        - Siliques linear.
          - Petals flat; anthers short, subcordate. 7. ARABIS (p. 291).
          - Petals twisted; anthers long, sagittate.......... 8. STREPTANTHUS (p. 296).
    - Siliques terete, not at all compressed.
      - Pods 4 cm. long or more.
        - Flowers white or red; stigmas entire; pods erect.......... 11. THELYPODIUM (p. 298).
        - Flowers yellow; stigmas 2-lobed; pods spreading.......... 12. ERYSIMUM (p. 299).
      - Pods less than 4 cm. long.
        - Herbage canescent; flowers white; low alpine perennials.......... 13. SMELOWSKIA (p. 300).
        - Herbage not canescent; flowers yellow or white.

Siliques beaked; seeds globose....... 14. **Brassica** (p. 301).
Siliques beakless; seeds oblong.
  Valves of the pods nerveless.... 9. **Roripa** (p. 296).
  Valves of the pods nerved.
    Annuals; leaves pinnate or pinnatifid.............. 15. **Sisymbrium** (p. 301).
    Perennials.
      Leaves entire or subentire................ 16. **Schoenocrambe** (p. 303).
      Leaves lyrate......... 17. **Campe** (p. 303).
Pods short, therefore silicles.
  Silicles compressed parallel to the partition.
    Flowers solitary on scapes, white; seeds winged. 1. **Platyspermum** (p. 286).
    Flowers racemose; seeds wingless.
      Silicles orbicular......................... 2. **Alyssum** (p. 287).
      Silicles ovate or oblong.................. 3. **Draba** (p. 287).
  Silicles not compressed, or compressed contrary to the partition.
    Plant aquatic, submerged; leaves subulate; pods subglobose................................ 18. **Subularia** (p. 303).
    Plants terrestrial; leaves not subulate.
      Pods terete, not compressed.
        Pubescence stellate; pods globose.... 10. **Lesquerella** (p. 298).
        Pubescence not stellate; pods oblong. 9. **Roripa** (p. 296).
      Pods compressed contrary to the partition.
        Valves nerveless; pod obcordate..... 24. **Physaria** (p. 306).
        Valves 1-nerved.
          Nerves of the valves obtuse, not prominent.
            Silicles cuneate, notched at apex.................... 19. **Bursa** (p. 303).
            Silicles not cuneate; not notched at apex.
              Cauline leaves sessile; pod elliptic......... 20. **Hutchinsia** (p. 304).
              Cauline leaves auriculate; pod obovoid... 21. **Camelina** (p. 304).
          Nerves of the valves forming acute keels or wings.
            Silicles orbicular or obovate; cells 1 or 2-seeded....... 22. **Lepidium** (p. 304).
            Silicles ovate or oblong; silicles 2 to several seeded... 23. **Thlaspi** (p. 305).

PLATYSPERMUM.

1. **Platyspermum scapigerum** Hook. Fl. Bor. Am. **1**: 68. 1830.

Type locality: "Moist rocks and in shallow soil at the Great Falls [Celilo Falls] of the Columbia." Collected by Douglas.

Range: Washington and Idaho to Nevada.

Specimens examined: Klickitat Valley, *Howell;* Colville, *Lyall*, March 31, 1861; Pullman, *Elmer* 82; *Piper*, April, 1894, May, 1893.

Zonal distribution: Arid Transition.

The stamens in this plant are variable in number, not uncommonly 4 or 5 in place of the normal 6. The peppery pods are eaten by children.

ALYSSUM.

1. **Alyssum alyssoides** (L.) Gouan, Hort. Monsp. 321. 1762.
Clypeola alyssoides L. Sp. Pl. **2**: 652. 1753.
Alyssum calycinum L. Sp. Pl. ed. 2. **2**: 908. 1763.
TYPE LOCALITY: "Habitat in Austria, Gallia."
SPECIMENS EXAMINED: Seattle, *Piper* in 1885; Pullman, *Piper*.

DRABA.

- Annuals.
  - Flowers white.
    - Petals deeply 2-cleft .... 1. *D. verna.*
    - Petals entire; pods hispid .... 2. *D. caroliniana micrantha.*
  - Flowers yellow.
    - Pods 6 to 8 mm. long, much shorter than pedicels .. 3. *D. nemorosa.*
    - Pods 8 to 15 mm, long, about equaling the pedicels .. 4. *D. stenoloba.*
- Perennials.
  - Midrib of leaves becoming prominent.
    - Flowers yellow; pods acute .... 5. *D glacialis.*
    - Flowers white; pods acuminate .... 6. *D. douglasii.*
  - Midrib of leaves not prominent.
    - Stems scapose; flowers white .... 7. *D. lonchocarpa.*
    - Stems very leafy; flowers yellow .... 8. *D. aureola.*

1. **Draba verna** L. Sp. Pl. **2**: 642. 1753.
TYPE LOCALITY: Europe.
SPECIMENS EXAMINED: Vancouver, *Suksdorf* 499; *T. E. Wilcox*, March, 1883; Walla Walla, *Leckenby*, April, 1898; Waitsburg, *Horner* 606.

2. **Draba caroliniana micrantha** (Nutt.) A. Gray, Man. ed. 5. 72. 1867.
Draba micrantha Nutt.; Torr. & Gr. Fl. **1**: 109. 1838.
TYPE LOCALITY: "Open plains and rocky places about St. Louis, and in Arkansas."
RANGE: Washington to Illinois, Texas, and New Mexico.
SPECIMENS EXAMINED: North Yakima, *Henderson*, May, 1892; Spokane, *Piper*, May, 1897; Waitsburg, *Horner* 74; Wawawai, *Piper* 2801.
ZONAL DISTRIBUTION: Arid Transition and Upper Sonoran.

3. **Draba nemorosa** L. Sp. Pl. **2**: 643. 1753.
TYPE LOCALITY: "Habitat in Sueciae nemoribus."
RANGE: British Columbia to Colorado and the Great Lakes. Europe. Siberia.
SPECIMENS EXAMINED: Whidby Island, *Gardner* 25; White Salmon, *Suksdorf* 232; Fort Colville, *Lyall* in 1861; *Geyer* 626; Hangman Creek, *Sandberg & Leiberg* 4; Pullman, *Piper* 1794; *Elmer* 151; Almota, *Piper*, April, 1894; Waitsburg, *Horner* 608; Wawawai, *Piper* 2800.
ZONAL DISTRIBUTION: Upper Sonoran and Arid Transition.

4. **Draba stenoloba** Ledeb. Fl. Ross. **1**: 154. 1841.
TYPE LOCALITY: "In ins. Unalaschka."
RANGE: Alaska to Colorado and California.
SPECIMENS EXAMINED: Olympic Mountains, *Flett* 102; Mount Baker, *Flett* 851; Klickitat River, *Flett* 1142 in part; Yakima County, *Henderson* 2385 B; Stevens Pass, *Sandberg & Leiberg* 758; Wenache Mountains, *Elmer* 434; Wenache Mountains, *Cotton* 1288.
ZONAL DISTRIBUTION: Hudsonian.

5. **Draba glacialis** Adams, Mem. Soc. Nat. Mosc. **5**: 106. 1817.
TYPE LOCALITY: "In promontorio Byskofskoymys," near the mouth of the Lena River, Siberia.

Range: Athabasca to Colorado and California. Siberia.

Specimens examined: Olympic Mountains, *Flett* 844; Cascade Mountains, latitude 49°, *Lyall* in 1860; Mount Adams, *Flett* 1131; Chiquash Mountains, *Suksdorf* 2426; Blue Mountains, *Piper* 2404.

Zonal distribution: Arctic.

6. **Draba douglasii** A. Gray, Proc. Am. Acad. **7**: 328. 1868.

Braya oregonensis A. Gray, Proc. Am. Acad. **17**: 199. 1882.

Type locality: "High Sierra Nevada; on the gravelly 'divide' between East Carson and West Walker Rivers." Collected by Anderson. Also from "the interior of Oregon or California." Collected by Douglas.

Specimens examined: Klickitat Hills, *Howell* 50, 386.

7. **Draba lonchocarpa** Rydberg, Mem. N. Y. Bot. Gard. **1**: 181. 1900.

Draba nivalis elongata S. Wats. Proc. Am. Acad. **23**: 258. 1888, not *D. elongata* Host. 1827.

Type locality: "Rocky Mountains, from British America to Wyoming and the Uintas; Mt. Adams."

Range: British Columbia and Alberta to Utah.

Specimens examined: Mount Rainier, *Piper* 2060; Mount Baker, *Flett* 856; Mount Adams, *Suksdorf* 239; Chiquash Mountains, *Suksdorf* 2541.

Zonal distribution: Arctic.

8. **Draba aureola** S. Wats. Bot. Cal. **2**: 430. 1880.

Type locality: "Sierra Nevada, in Sierra County," California.

Range: Washington to California.

Specimens examined: Mount Rainier, *Flett* 286; *Piper* 2061; *Smith & Piper* 699.

Zonal distribution: Arctic.

Draba lemmoni S. Wats. This species is accredited to Washington on a specimen collected by Flett in the Olympic Mountains and thus determined by Wiegand.[a] This specimen certainly is not *D. lemmoni*, but is probably an undescribed species. The material is too young, however, for satisfactory description.

DENTARIA.

Basal leaves cordate-orbicular, crenate or sinuate........... 1. *D. tenella*.
Basal leaves parted or divided into 3 or 5 segments.
  Petals 10 to 12 mm. long.............................. 2. *D. macrocarpa*.
  Petals 12 to 16 mm. long.............................. 3. *D. macrocarpa pulcherrima*.

1. **Dentaria tenella** Pursh, Fl. **2**: 439. 1814.

Type locality: "On the banks of the Columbia." Collected by Lewis, the exact place near the mouth of Sandy River, Oregon.

Range: Washington and Oregon.

Specimens examined: Whidby Island, *Gardner* 14; Silverton, *Bouck* 21; Tacoma, *Flett* 70; Snoqualmie, *Hindshaw*; upper Nisqually Valley, *Allen* 51; Nisqually tide flats, *Flett* 95; west Klickitat County, *Suksdorf* 4, 235; Seattle, *Piper* in 1888.

Zonal distribution: Humid Transition.

2. **Dentaria macrocarpa** Nutt.; Torr. & Gr. Fl. **1**: 88. 1838.

Cardamine quercetorum Howell, Erythea **3**: 33. 1895.

Cardamine tenella covilleana Schulz; Engler's Bot. Jahrb. **32**: 391. 1903.

Cardamine tenella dissecta Schulz, op. cit.

Cardamine tenella quercetorum Schulz, op. cit. 390.

Type locality: "Woods of the Oregon." Collected by Nuttall.

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[a] Bull. Torr. Club **5**: 209. 1874.

RANGE: British Columbia to north California.

SPECIMENS EXAMINED: West Klickitat County, *Suksdorf* 1927, 95, 500, 501, 233; Darling Mountains, *Flett* 1136; Simcoe Mountains, *Howell*, June, 1879; Klickitat Hills, *Gorman*, April, 1895.

A variable species. Schulz's subspecies are based entirely on characters of leaf outline, but these seem too variable to rely upon. Field study and large suites of specimens are necessary before the species can be satisfactorily understood.

2a. Dentaria macrocarpa pulcherrima (Greene) Robinson in Gray, Syn. Fl. 1^1: 154. 1895.

Cardamine pulcherrima Greene, Erythea **1**: 148. 1893.

TYPE LOCALITY: Near Mosier, Oregon. Collected by Howell.

RANGE: Oregon and Washington.

SPECIMENS EXAMINED: Klickitat Hills, *Howell* 1408.

CARDAMINE.

Leaves all simple.
  Alpine dwarf; leaves ovate or elliptic, entire.................... 1. *C. bellidifolia.*
  Subalpine, tall; leaves cordate or reniform, sinuate............. 2. *C. lyallii.*
Leaves, or some of them, pinnate.
  Basal leaves simple; cauline 3 to 5-foliolate.
    Leaf margin entire or merely sinuate...................... 3. *C. breweri.*
    Leaf margin crenately 7 to 9-lobed .... 4. *C. vallicola.*
  Basal leaves pinnate.
    Leaves all 3-foliolate, sometimes 5-foliate; leaflets coarsely 3 to 5-toothed... 5. *C. angulata.*
    Leaves 3 to 9-foliolate.
      Petals 4 mm. long; leaflets 5 to 9, orbicular........... 6. *C. occidentalis.*
      Petals 2 to 4 mm. long; leaflets 3 to 7.
        Flowers subumbellate............................ 7. *C. kamtschatica.*
        Flowers racemose.
          Capsules 20 to 30-seeded; leaflets mostly oblong.................................... 8. *C. pennsylvanica.*
          Capsules 8 to 20-seeded; leaflets mostly roundish.................................... 9. *C. oligosperma.*

1. Cardamine bellidifolia L. Sp. Pl. **2**: 654. 1753.

TYPE LOCALITY: "Habitat in Alpibus Lapponiae, Helvetiae, Brittaniae."

RANGE: Alaska to California, Montana, and the White Mountains. Europe. Asia.

SPECIMENS EXAMINED: Chiquash Mountains, *Suksdorf* 2363.

ZONAL DISTRIBUTION: Arctic.

2. Cardamine lyallii S. Wats. Proc. Am. Acad. **22**: 466. 1887.

Cardamine lyallii pilosa Schulz, Engler's Bot. Jahrb. **32**: 438. 1903.

TYPE LOCALITY: "Banks of the Ashtnola, Cascade Mountains." Collected by Lyall in 1860.

RANGE: British Columbia to California and Utah.

SPECIMENS EXAMINED: Klickitat River, *Flett* 1135; banks of the Ashnola, Cascade Mountains, *Lyall* in 1860; Blue Mountains, *Piper* 2455; *Horner* in 1897; without locality, *Vasey* in 1889; Wenache Mountains, *Cotton* 1642; *Elmer* 435; Cascade Mountains, *Wilkes Expedition.*

ZONAL DISTRIBUTION: Hudsonian and Canadian.

Schulz's subspecies *pilosa* includes forms with more or less pubescence. It seems scarcely worthy of recognition.

3. **Cardamine breweri** S. Wats. Proc. Am. Acad. **10**: 339. 1875.

Cardamine orbicularis Greene, Pittonia **4**: 202. 1901.

Type locality: California, "near Sonora Pass at 8-10,000 feet altitude." Collected by Brewer.

Range: Washington to Wyoming and California.

Specimens examined: Tacoma, *Flett* 106, 178; upper Nisqually Valley, *Allen* 52; Quinault, *Conard* 173.

Zonal distribution: Humid Transition.

4. **Cardamine vallicola** Greene, Pittonia **3**: 116. 1896.

Cardamine callosicrenata Piper, Bot. Gaz. **22**: 488. 1897.

Type locality: "Wet meadows along Dale Creek, Wyoming."

Range: Washington to Wyoming and California.

Specimens examined: Mount Carlton, *Kreager* 302; Spokane, *Piper* in 1896.

Zonal distribution: Arid Transition.

5. **Cardamine angulata** Hook. Fl. Bor. Am. **1**: 44. 1829.

Cardamine angulata pentaphylla Schulz, Engler's Bot. Jahrb. **32**: 407. 1903.

Type locality: "Banks of the Columbia." Collected by Scouler and by Douglas.

Range: Washington and Oregon west of the Cascade Mountains.

Specimens examined: Hoquiam, *Lamb* 1053; Montesano, *Heller* 3863; Tacoma, *Flett* 45; upper Valley Nisqually, *Allen* 128, 128a; Ilwaco, *Piper* 4955.

Zonal distribution: Humid Transition.

6. **Cardamine occidentalis** (S. Wats.) Howell, Fl. N. W. Am. 50. 1897.

Cardamine pratensis occidentalis S. Wats. in Gray, Syn. Fl. **1^1**: 158. 1895.

Type locality: Sauvies Island, Oregon. Collected by Howell.

Range: Washington and Oregon.

Specimens examined: West Klickitat County, *Suksdorf*; Tacoma, *Flett* 89 in part; North Yakima, *Henderson*, June 19, 1892.

7. **Cardamine kamtschatica** (Regel) Schulz, Engler's Bot. Jahrb. **32**: 470. 1903.

Cardamine sylvatica kamtschatica Regel, Bull. Soc. Nat. Mosc. **34^2**: 172. 1861.

Cardamine umbellata Greene, Pittonia **3**: 154. 1897.

Type locality: Kamtschatca.

Range: Alaska to Oregon. Siberia.

Specimens examined: Olympic Mountains, *Piper* 1018, 2183; Mount Rainier, *Piper* 2061; near Fort Colville, *Lyall* in 1861; Mount Rainier, *Flett* 2149.

Zonal distribution: Arctic.

8. **Cardamine pennsylvanica** Muhl.; Willd. Sp. Pl. **3^1**: 486. 1800.

Cardamine hirsuta acuminata Nutt.; Torr. & Gr. Fl. **1**: 85. 1838.

Cardamine acuminata Rydberg, Bull. Torr. Club **29**: 237. 1902.

Type locality: Pennsylvania.

Range: Temperate North America.

Specimens examined: Seattle, *Piper* 1116; Silverton, *Bouck* 18; Tacoma, *Flett* 89 in part; Cascade Mountains, latitude 49°, *Lyall* in 1859; Nisqually Valley, *Allen* 53; west Klickitat County, *Suksdorf* 503; Klickitat River, *Flett* 1139; Fort Colville, *Lyall* in 1861; Horseshoe Basin, *Elmer* 733; Wenache, *Whited* 38; Rock Lake, *Piper* 2797; Hangman Creek, *Sandberg & Leiberg* 63.

Zonal distribution: Transition.

9. **Cardamine oligosperma** Nutt.; Torr. & Gr. Fl. **1**: 85. 1838.

Type locality: "Shady woods of the Oregon." Collected by Nuttall.

Range: British Columbia to California.

SPECIMENS EXAMINED: Hoquiam, *Lamb* 1026; Clallam County, *Elmer* 2692; Whidby Island, *Gardner* 24; Seattle, *Piper* 546; Tacoma, *Flett* 76; San Juan Island, *Lyall* in 1858; Goat Mountains, *Allen*, August 23, 1895; without locality, *Cooper*.

ZONAL DISTRIBUTION: Humid Transition.

The following specimens seem to me ambiguous between *C. oligosperma* and *C. pennsylvanica* and I am unable to refer them elsewhere: Seattle, *Piper* 732; Tacoma, *Flett*, April 20, 1896; west Klickitat County, *Suksdorf* 505, 504; Skokomish River, *Piper* 2182; *Kincaid*; Pend Oreille River, *Lyall* in 1861; Waitsburg, *Horner* 588, 79; Wawawai, *Elmer*.

PARRYA.

1. **Parrya menziesii** (Hook.) Greene, Fl. Fran. 253. 1891.

Phoenicaulis menziesii Greene, Bull. Torr. Club. **13**: 143. 1886.

Hesperis menziesii Hook. Fl. Bor. Am. **1**: 60. 1830.

Phoenicaulis cheiranthoides Nutt.; Torr. & Gr. Fl. **1**: 89. 1838.

TYPE LOCALITY: California. Collected by Menzies.

RANGE: Washington to California and Nevada.

SPECIMENS EXAMINED: Ellensburg, *Piper* 2712; Kittitas Valley, *Whited* 68; Blue Mountains, *Piper* 2414.

ZONAL DISTRIBUTION: Arid Transition.

1a. **Parrya menziesii lanuginosa** S. Wats. in Gray, Syn. Fl. 1^1: 152. 1895.

TYPE LOCALITY: "Lower Columbia Valley, east of the Cascades, *Douglas, Suksdorf*."

RANGE: Washington to California.

SPECIMENS EXAMINED: Columbia River, *Douglas* in 1830; between Klickitat Valley and Columbia River, *Suksdorf* 236; east side Columbia below the Chelan, *Watson* 28; near Goldendale, *Howell* 43; Wenache, *Whited* 1019; North Yakima, *Mrs. Steinweg* in 1894; Crab Creek, *Sandberg & Leiberg* 242; without locality, *Vasey* in 1889; Klickitat Hills, *Gorman*, April, 1895; Rattlesnake Mountains, *Cotton* 551.

ZONAL DISTRIBUTION: Arid Transition.

ARABIS. Rock cress.

- Seeds wingless; flowers white.
  - Radical leaves pinnately cleft into short and broad segments.. 1. *A. lyrata occidentalis.*
  - Radical leaves entire.
    - Cauline leaves not auriculate.
      - Herbage wholly stellate-pubescent................ 2. *A. whitedii.*
      - Herbage glabrous above, pubescent below with simple or forked hairs.......................... 3. *A. nuttallii.*
    - Cauline leaves auriculate; plant glaucous, glabrous except near the base.......................... 4. *A. glabra.*
- Seeds winged or wing-margined.
  - Seeds arranged in a single row.
    - Cauline leaves sessile not cordate or auricled............ 5. *A. furcata.*
    - Cauline leaves cordate or auriculate at base........... 6. *A. hirsuta.*
  - Seeds more or less distinctly in two rows.
    - Cauline leaves not at all auriculate at base; leaves all entire, villous-hirsute.......................... 18. *A. cusickii.*
    - Cauline leaves auriculate or cordate.
      - Radical leaves dentate.
        - Pods reflexed, usually straight; whole plant finely stellate-pubescent.................. 7. *A. holboellii.*
        - Pods arcuate, spreading.
          - Flowers dark-purple; basal leaves somewhat pubescent, the upper glabrous and glaucous.......................... 8. *A. atrorubens.*

Flowers rose-colored; whole plant roughly stellate-pubescent.
Base of the stems woody and branched. 9. *A. perennans.*
Base of the stems herbaceous or nearly so, simple.................. 10. *A. sparsiflora.*
Radical leaves entire or merely denticulate.
Pods reflexed.
Pubescence densely and finely stellate, whitish; pods 2 mm. wide............ 12. *A. puberula.*
Pubescence scant, stellate, or wanting; pods 3 to 5 mm. wide................ 13. *A. suffrutescens.*
Pods not reflexed.
Pods divaricate; herbage soft pubescent with stellate hairs.................... 11. *A. bolanderi.*
Pods ascending.
Plant glaucous; lower leaves finely and densely stellate-pubescent........ 14. *A latifolia.*
Plant green; pubescence scanty.
Stems several, slender, from a woody caudex; leaves small... 17. *A. microphylla.*
Stems solitary or few from a herbaceous or scarcely woody base.
Tall 30 to 60 cm.; plant somewhat glaucous; pubescence of 2-forked hairs......... 15. *A. drummondii.*
Low 10 to 30 cm.; plant glabrous or somewhat stellate pubescent below......... 16. *A. lyallii.*

1. Arabis lyrata occidentalis S. Wats. in Gray, Syn. Fl. 1^1: 159. 1895.

TYPE LOCALITY: "From Alaska to British Columbia and the eastern side of the Rocky Mts. in Brit. America; Point Pelee on Lake Erie, *Macoun.*"

RANGE: Alaska to Washington and eastward to Lake Erie.

SPECIMENS EXAMINED: "On Nooksack River near Mount Baker," *Suksdorf* 1999.

ZONAL DISTRIBUTION: Hudsonian.

2. Arabis whitedii Piper, Bull. Torr. Club **28**: 39. 1901.

TYPE LOCALITY: Wenache, Washington. Collected by Whited.

RANGE: Eastern Washington.

SPECIMENS EXAMINED: Wenache, *Whited* 1057; Crab and Wilson creeks, *Sandberg & Leiberg* 275.

ZONAL DISTRIBUTION: Upper Sonoran.

Mature specimens collected by Whited, May 19, 1905, show the ripe pods to be nearly erect, 17 to 20 mm. long, finely and densely stellate-pubescent, and nearly always longer than the divergent pedicels with which they form a pronounced angle; seeds wingless, in a single row; cotyledons accumbent. It may be a biennial.

This species is not closely related to any other, in my opinion, but is to be associated perhaps with *A. nuttallii* Robinson.

3. Arabis nuttallii Robinson in Gray, Syn. Fl. 1^1: 160. 1895.

Arabis spathulata Nutt.; Torr. & Gr. Fl. **1**: 81. 1838, not DC. 1821.

TYPE LOCALITY: "Lofty dry hills of the Platte, from the Black Mountains to the central chain."

RANGE: Washington to Montana and Nevada.

Specimens examined: Klickitat River, *Flett* 1142 in part; Mount Stuart, *Elmer* 1223 (?); North Yakima, *Steinweg;* Sprague, *Sandberg & Leiberg* 202; Lincoln County, *Henderson* 2387; Medical Lake, *Sandberg & Leiberg* 50; Spokane County, *Suksdorf* 237; Crab Creek, *Suksdorf* 238; Spokane Valley, *Lyall* in 1861; Spokane, *Piper* 2950; St. John, *Piper* 2792; Mount Adams, *Cotton* 1533.

Zonal distribution: Arid Transition and Upper Sonoran.

4. **Arabis glabra** (L.) Bernh. Syst. Verz. Erf. 195. 1800.

Turritis glabra L. Sp. Pl. **2**: 666. 1753.

Arabis perfoliata Lam. Encyc. **1**: 219. 1783.

Turritis macrocarpa Nutt.; Torr. & Gr. Fl. **1**: 78. 1838.

Type locality: Europe.

Range: British Columbia to New England southward to California, Colorado, and New Jersey. Europe. Asia.

Specimens examined: Clallam County, *Elmer* 2694; Nisqually Valley, *Allen*, June 11, 1894; Klickitat River, *Flett* 1140; Rock Island, *Henderson*; Sprague, *Sandberg & Leiberg* 143; without locality, *Vasey* in 1889; Pullman, *Piper* 1472; *Elmer* 844; Clarks Springs, *Kreager* 110.

Zonal distribution: Transition.

5. **Arabis furcata** S. Wats. Proc. Am. Acad. **17**: 362. 1882.

Type locality: "Bluffs of the Columbia River near the mouth of Hood River," Oregon. Collected by Howell.

Range: Washington and Oregon.

Specimens examined: Atanum River, *Henderson*, August, 1892; Mount Adams, *Suksdorf; Howell; Henderson* 58; without locality, *Brandegee* 625.

6. **Arabis hirsuta** Scop. Fl. Carn. ed. 2. **2**: 30. 1772.

Arabis rupestris Nutt.; Torr. & Gr. Fl. **1**: 81. 1838.

Type locality: Carniolia.

Range: Alaska to Labrador, southward to New Mexico and Virginia. Asia. Europe.

Specimens examined: Fairhaven, *Piper*, July, 1897; Semiamoo Bay, *Lyall* in 1858; Admiralty Head, *Piper*, April, 1898; Silverton, *Bouck* 20a; Skokomish Valley, *Kincaid*, May, 1892; Tacoma, *Flett*, April, 1896; Nisqually Valley, *Allen*, June, 1894; Klickitat River, *Flett* 1138; Coppei River, *Horner* 80; Almota, *Piper*, May 11, 1901; without locality, *Geyer* 565.

Zonal distribution: Transition.

When growing in dense shade, the plants are often nearly glabrous. This form is *A. hirsuta glabrata* Torr. & Gr.[a]

7. **Arabis holboellii** Hornem. Fl. Dan. **11**: 5. *pl. 1879.* 1827.

Arabis retrofracta Graham, Edinb. New Phil. Journ. **1829**: 344. 1829.

Type locality: "In rupibus Insulae Disco ad Jacobshavn detexit."

Range: Washington and Colorado to British America. Greenland.

Specimens examined: Wenache, *Whited*, May 28, 1898, 39; Ellensburg, *Whited* 312, 379; *Piper* 2707; Lower Cascades, *Suksdorf*, May 30, 1886; Klickitat River, *Suksdorf*, May 18, 1884; North Yakima, *Henderson* 2395; Sprague, *Sandberg & Leiberg* 139; Ritzville, *Sandberg & Leiberg* 158; Douglas County, *Spillman*, 2630; Pine City, *Piper* 2427; Spokane, *Piper* 2822, 2690; Spokane Valley, *Lyall* in 1861; Mount Carlton, *Kreager* 288; Blue Mountains, *Horner* 274 in part; Pullman, *Elmer* 207; without locality, *Vasey* in 1889.

Zonal distribution: Arid Transition.

7a. **Arabis holboellii patula** (Graham) S. Wats. in Gray, Syn. Fl. **1**^{1}: 164. 1895.

Turritis patula Graham, Edinb. New Phil. Journ. **1829**: 350. 1829.

Arabis columbiana Macoun, Cat. Canad. Pl. **2**: 304. 1890.

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[a] Fl. **1**: 80. 1838.

Type locality: "The seeds of this species were gathered in Captain Franklin's expedition at Hudson Bay, in Canada and in the Rocky Mountains."

Range: British Columbia and Washington to Hudson Bay.

Specimens examined: Green River Hot Springs, *Piper* 544.

8. **Arabis atrorubens** Greene, Erythea **1**: 223. 1893.

Arabis atriflora Suksdorf, Deutsch. Bot. Monatss. **16**: 211. 1899.

Type locality: Klickitat County, Washington. Collected by Suksdorf.

Range: Eastern Washington.

Specimens examined: West Klickitat County, *Suksdorf* 2105; Wenache, *Whited* 67, 1531; Simcoe Mountains, *Howell*, June, 1879; Darling Mountains, *Flett* 1137; Klickitat Hills, *Gorman*, April, 1895; Wenache Mountains, *Cotton* 1290.

9. **Arabis perennans** S. Wats. Proc. Am. Acad. **22**: 467. 1887.

Type locality: From northern Nevada and Utah to Arizona and the San Bernardino Mountains in California."

Range: Washington to California and Arizona.

Specimens examined: Without locality, *Vasey* in 1889.

10. **Arabis sparsiflora** Nutt.; Torr. & Gr. Fl. **1**: 81. 1838.

Arabis arcuata subvillosa S. Wats. in Gray, Syn. Fl. 1^1: 164. 1895.

Type locality: "Forests of the Rocky Mountains, towards the sources of the Oregon."

Range: Washington and Idaho to California and Nevada.

Specimens examined: Ellensburg, *Piper*, May 21, 1897; Clealum, *Whited* 367; Mount Cleman, *Henderson* 2395; banks of the Columbia, *Douglas* in 1829; Colville, *Lyall* in 1861; Rock Creek, *Sandberg & Leiberg* 97; Spokane, *Piper* 2821; Pullman, *Hull* 471; *Piper* 1471, 1812, 1811; *Elmer* 88; without locality, *Vasey* in 1889.

Zonal distribution: Arid Transition.

There is considerable doubt as to the identity of Nuttall's species and it may not be our plant. The latter is unquestionably the subspecies *subvillosa* of Watson.

10a. **Arabis sparsiflora secunda** (Howell).

Arabis secunda Howell, Erythea **3**: 33. 1895 (February).

Arabis arcuata secunda Robinson in Gray, Syn. Fl. 1^1: 164. 1895 (October).

Type locality: Mount Adams, Washington. Collected by Howell.

Range: Eastern Washington.

Specimens examined: Mount Adams, *Howell* 1487; west Klickitat County, *Suksdorf* 240, 241; Larm River, *Suksdorf* 97; Upper Yakima River, *Lyall* in 1860; Wenache, *Whited* 1031.

11. **Arabis bolanderi** S. Wats. Proc. Am. Acad. **22**: 467. 1887.

Type locality: "Yosemite Valley or Mono Pass," California.

Range: Washington to California.

Specimens examined: Without locality, *Brandegee* 632.

12. **Arabis puberula** Nutt.; Torr. & Gr. Fl. **1**: 82. 1838.

Arabis canescens Nutt.; Torr. & Gr. Fl. **1**: 83. 1838.

Arabis tenuis Greene, Pittonia **4**: 189. 1901.

Type locality. "Forests of the Blue Mountains of Oregon." Collected by Nuttall.

Range: Washington, Oregon, and Idaho.

Specimens examined: Mount Cleman, *Henderson* 2389; White Salmon, *Suksdorf*, July, 1881; Ellensburg, *Whited* 2707; *Piper*, July 9, 1897; Tampico, *Flett* 1125; Wenache, *Whited*, April, 1900; Blue Mountains, *Horner* 274; Coulee City, *Piper* 3848; west Klickitat County, *Suksdorf* 15.

Zonal distribution: Upper Sonoran and Arid Transition.

13. Arabis suffrutescens S. Wats. Proc. Am. Acad. **17**: 362. 1882.

TYPE LOCALITY: "Bluffs of the Snake River and vicinity, Union County, Oregon." Collected by Cusick.

RANGE: Washington and Oregon.

SPECIMENS EXAMINED: Mount Adams, *Suksdorf* 98, 511.

14. Arabis latifolia (S. Wats.).

Arabis canescens latifolia S. Wats. Bot. King Explor. 17. 1871.

Arabis lemmoni S. Wats. Proc. Am. Acad. **22**: 467. 1887.

TYPE LOCALITY: Clover Mountains, Nevada. Collected by Watson.

RANGE: Washington to Montana and California.

SPECIMENS EXAMINED: Mount Adams, *Suksdorf* 509, 510, 1920; *Henderson* 2391.

15. Arabis drummondii A. Gray, Proc. Am. Acad. **6**: 187. 1863–65.

Turritis stricta Graham, Edinb. New Phil. Journ. **1829**: 350. 1829, not *Arabis stricta*, Host. 1827.

Streptanthus angustifolius Nutt.; Torr. & Gr. Fl. **1**: 76. 1838, not *Arabis angustifolius* Lam. 1783.

TYPE LOCALITY: Rocky Mountains. Collected by Drummond.

RANGE: California and Colorado, northward into British America.

SPECIMENS EXAMINED: Olympic Mountains, *Piper* 2181; Clallam County, *Elmer* 2693 in part; Mount Rainier, *Piper* 2065; north of Mount Adams, *Henderson* 2397; Mount Baker, *Flett* 859; Horseshoe Basin, *Lake & Hull*, August 24, 1892; Stevens Pass, *Sandberg & Leiberg* 764.

ZONAL DISTRIBUTION: Hudsonian.

16. Arabis lyallii S. Wats. Proc. Am. Acad. **11**: 122. 1876.

Arabis drummondii alpina S. Wats. Bot. King Explor. 18. 1871, not *A. alpina* L.

TYPE LOCALITY: "In the mountains from Washington Territory to Mono Pass in the Sierra Nevada and eastward to W. Wyoming and Utah."

RANGE: British Columbia to California and Utah.

SPECIMENS EXAMINED: Olympic Mountains, *Piper* 2180; *Flett* 94; Mount Rainier, *Piper* 2066, 2064; *Smith* 801; *Allen* 299; Clallam County, *Elmer* 2693 in part; Mount Adams, *Henderson* 2390; *Suksdorf* 508, 96; *Howell* 557; Ashnola River, Cascade Mountains, *Lyall*; Blue Mountains, *Horner* 282.

ZONAL DISTRIBUTION: Arctic.

17. Arabis microphylla Nutt.: Torr. & Gr. Fl. **1**: 82. 1838.

TYPE LOCALITY: "Rocky Mountains." Collected by Nuttall.

RANGE: Washington to Wyoming and Nevada.

SPECIMENS EXAMINED: White Salmon, *Suksdorf* 2.

18. Arabis cusickii S. Wats. Proc. Am. Acad. **17**: 363. 1882.

TYPE LOCALITY: "On rocky ridges, Union County, Oregon." Collected by Cusick.

RANGE: Washington and Oregon.

SPECIMENS EXAMINED: Ellensburg, *Piper* 2711; Cleman Mountain, *Henderson* 2388 in part; Johnson Canyon, *Brandegee* 624; Rock Creek, *Sandberg & Leiberg* 92; between Coulee City and Waterville, *Spillman*, May, 1896; Coulee City, *Piper* 3841; Spokane County, *Suksdorf* 1921; Pine City, *Piper* 2828, 2829, the latter ambiguous toward *A. sparsiflora*.

ZONAL DISTRIBUTION: Arid Transition.

ARABIS BREWERI S. Wats. Proc. Am. Acad. **11**: 123. 1876. This species appears in Suksdorf's list, but we have seen no Washington specimens.

STREPTANTHUS.

1. **Streptanthus longirostris** S. Wats. Proc. Am. Acad. **25**: 127. 1890.
Arabis longirostris S. Wats. Bot. King Explor. **17**: *pl. 2.* 1871.
TYPE LOCALITY: "Growing in alkaline soil at the Steamboat Springs near Washoe City, about Humboldt Lake, Nevada, and on Stansbury Island in Salt Lake."
RANGE: Washington to Nevada and Utah.
SPECIMENS EXAMINED: Pasco, *Henderson* 2378; without locality, *Brandegee* 629.
ZONAL DISTRIBUTION: Upper Sonoran.

RORIPA.

Flowers white; leaves pinnately divided .... 1. *R. nasturtium.*
Flowers yellow; leaves various, mostly pinnate.
Plants perennial by rootstocks.
Pods glabrous or nearlyso .... 2. *R. sinuata.*
Pods not glabrous.
Pods pappilose-puberulent .... 3. *R. calycina.*
Pods soft pubescent, short-pediceled .... 4. *R. columbiae.*
Plants annual or biennial, without rootstocks.
Pedicels short, 2 to 4 mm. long; stems diffuse.
Pods curved; leaf-lobes acute .... 5. *R. curvisiliqua.*
Pods straight; leaf-lobes obtuse .... 6. *R. obtusa.*
Pedicels longer, 6 to 8 mm. long; stems erect.
Pods oval or globose; stems hispid .... 7. *R. hispida.*
Pods oblong; stems glabrous or nearly so.
Pods 4 to 8 mm. long .... 8. *R. palustris.*
Pods 8 to 12 mm. long .... 9. *R. pacifica.*

1. **Roripa nasturtium** (L.) Rusby, Mem. Torr. Club 3^3: 5. 1893. WATER CRESS.
Sisymbrium nasturtium L. Sp. Pl. **2**: 657. 1753.
Nasturtium officinale R. Br. in Ait. Hort. Kew. ed. 2. **4**: 110. 1812.
TYPE LOCALITY: "Habitat in Europa & America septentrionali ad fontes."
SPECIMENS EXAMINED: Tacoma, *Flett* 6; Wawawai, *Elmer* 765; *Hull* 477; Clarks Springs, *Kreager* 124; Colville, *Kreager* 523.

2. **Roripa sinuata** (Nutt.) A. S. Hitchcock, Spring Fl. Manhat. 18. 1894.
Nasturtium sinuatum Nutt.; Torr. & Gr. Fl. **1**: 73. 1838.
TYPE LOCALITY: "Banks of the Oregon and its tributaries." Collected by Nuttall.
RANGE: Washington to Saskatchewan, Arkansas, and New Mexico.
SPECIMENS EXAMINED: West Klickitat County, *Suksdorf* 2103; Almota, *Piper* 2653, 2654.
ZONAL DISTRIBUTION: Upper Sonoran.

3. **Roripa calycina** (Engelm.) Rydberg, Mem. N. Y. Bot. Gard. **1**: 175. 1900.
Nasturtium calycinum Engelm. in Warren, Prelim. Rep. 156. 1855–7.
TYPE LOCALITY: "Sandy bottoms of Yellowstone River; Fort Sarpy to Fort Union."
RANGE: Washington and Oregon to Montana.
SPECIMENS EXAMINED: Without locality, *Sandberg & Leiberg* in 1892.

4. **Roripa columbiae** Suksdorf; Howell, Fl. N. W. Am. **1**: 40. 1897.
Nasturtium sinuatum columbiae Suksdorf; Robinson in Gray, Syn. Fl. 1^1: 147. 1895.
Nasturtium columbiae Suksdorf, Deutsch. Bot. Monat. **16**: 211. 1898.
TYPE LOCALITY: "Low gravelly banks of the Columbia River near Bingen," Washington.
RANGE: Oregon and Washington on gravelly river banks.
SPECIMENS EXAMINED: Near Bingen, *Suksdorf* 952.

5. **Roripa curvisiliqua** (Hook.) Bessey, Mem. Torr. Club **5**: 169. 1894.
Sisymbrium curvisiliqua Hook. Fl. Bor. Am. **1**: 61. 1830.
Nasturtium curvisiliqua Nutt; Torr. & Gr. Fl. **1**: 73. 1838.
Nasturtium curvisiliqua nuttallii S. Wats. in Gray, Syn. Fl. **1**: 148. 1895.

TYPE LOCALITY: "Common on the Northwest coast of America, lat. 47°–48°, in sandy soils, near streams." Collected by Douglas.

RANGE: British Columbia to Wyoming and Lower California.

SPECIMENS EXAMINED: Montesano, *Heller* 3852; Seattle, *Piper* 1840; Tacoma, *Flett* 36; Skamania County, *Suksdorf* 517; Falcon Valley, *Suksdorf* 576, 1900; Bingen, *Suksdorf* 2361; Skokomish River, *Piper* in 1890; Ellensburg, *Whited* 674; Kalama, *Piper*, October 31, 1901; Roslyn, *Whited* 1205; Spokane, *Dewart*, July 15, 1901; October 11, 1900; Pullman, *Elmer* 819; *Piper* 1474, 1840; *Lake & Hull* 476; Tumwater Canyon, *Sandberg & Leiberg* 522; Spokane, *Kreager* 559.

ZONAL DISTRIBUTION: Transition.

A very variable species divided by Nuttall into four, namely, *Nasturtium lyratum*, *N. polymorphum*, *N. cernuum*, and *N. curvisiliqua*.[a] If there are good characters to separate these, they remain to be pointed out. The type specimen of *lyratum* has an evident style; that of *polymorphum* is almost obsolete.

6. **Roripa obtusa** (Nutt.) Britton, Mem. Torr. Club **5**: 169. 1894.
Nasturtium obtusum Nutt.; Torr. & Gr. Fl. **1**: 74. 1838.

TYPE LOCALITY: "Banks of the Mississippi."

RANGE: British Columbia to Michigan, California, and Texas.

SPECIMENS EXAMINED: Falcon Valley, *Suksdorf* 2300; Bingen, *Suksdorf* 2299, 2353; Lake Chelan, *Elmer*, September, 1897, Spokane County, *Suksdorf* 1901.

The Bingen specimens have been referred to *R. tenerrima* Greene, but they seem not distinct from *R. obtusa*. The species is variable.

7. **Roripa palustris** (L.) Besser, Enum. 27. 1822.
Sisymbrium amphibium palustre L. Sp. Pl. **2**: 657. 1753.
Nasturtium terrestre R. Br. in Ait. Hort. Kew. ed. 2. **4**: 110. 1812.
Nasturtium palustre DC. Syst. **2**: 191. 1821.

TYPE LOCALITY: Europe.

RANGE: Subarctic regions, south to California and North Carolina. Europe. Asia.

SPECIMENS EXAMINED: Seattle, *Piper*, July 10, 1895; Lake Union, *Suksdorf* 1903; Colville, *Lyall* in 1860; Usk, *Kreager* 353; Wenache, *Whited.*

ZONAL DISTRIBUTION: Transition.

8. **Roripa pacifica** Howell, Fl. N. W. Am. 40. 1897.
Roripa clavata Rydberg, Bull. Torr. Club **29**: 235. 1902.
Nasturtium terrestre occidentale S. Wats. in Gray, Syn. Fl. **1**^{1}: 148. 1895, not *Nasturtium occidentale* Greene, Fl. Fran. 268. 1891.

TYPE LOCALITY: Shumagin Islands, Alaska.

RANGE: Alaska to Oregon.

SPECIMENS EXAMINED: Cascade Mountains, latitude 49°, *Lyall* in 1858–59; west Klickitat County, *Suksdorf* 519, 721; Peshastin, *Sandberg & Leiberg* 509; Waitsburg, *Horner* 83; Hoquiam, *Lamb* 1221.

ZONAL DISTRIBUTION: Transition.

9. **Roripa hispida** (Desv.) Britton, Mem. Torr. Club **5**: 169. 1894.
Brachylobus hispidus Desv. Journ. Bot. **3**: 183. 1814.
Nasturtium terrestre hispidum Fisch. & Mey. Ind. Sem. Hort. Petrop. **3**: 41. 1837.
Nasturtium hispidum DC. Syst. **2**: 201. 1821.

TYPE LOCALITY: "Habitat in Pennsylvania."

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[a] Torr. & Gr. Fl. 1: 73, 74. 1838.

RANGE: British Columbia to New Brunswick, south to Arizona and Florida.

SPECIMENS EXAMINED: North Yakima, [illegible] Bingen, *Suksdorf* 2350, 2352: Coulee City, *Lake & Hull* 470.

ZONAL DISTRIBUTION: Upper Sonoran.

LESQUERELLA.

Pods oval; pubescence not stellate . . . . 1. *L. occidentalis.*
Pods obovate; pubescence stellate . . . . 2. *L. douglasii.*

1. Lesquerella occidentalis S. Wats. Proc. Am. Acad. **23**: 251. 1888.

Vesicaria occidentalis S. Wats. Proc. Am. Acad. **20**: 353. 1885.

TYPE LOCALITY: "Near Yreka, California."

RANGE: Washington to California.

SPECIMENS EXAMINED: Near Mount Adams, 5 miles from Klickitat River, *Flett* 1137.

2. Lesquerella douglasii S. Wats. Proc. Am. Acad. **23**: 257. 1888.

TYPE LOCALITY: "On the Columbia River east of the Cascade Mountains. *Wilkes, Lyall, Suksdorf.*"

RANGE: Eastern Washington and eastern Oregon.

SPECIMENS EXAMINED: Wenatchee, *Whited* 1114 in 1893; Rock Island, *Sandberg & Leiberg* 426; White Bluffs of Columbia, *Brandegee* [illegible]; near Columbus, *Suksdorf* in 1886; without locality, *Vasey* in 1889; Columbia Valley, *Lyall* in 1860; without locality, *Douglas* in 1829; Klickitat County, *Suksdorf* 862; Pasco, *Henderson*, May, 1892; between Coulee City and Waterville, *Spillman*, May, 1892; Coulee City, *Griffiths & Cotton* 312.

ZONAL DISTRIBUTION: Upper Sonoran.

The Brandegee specimens are erroneously associated with *L. occidentalis* S. Wats. in the Synoptical Flora.

THELYPODIUM.

Cauline leaves auriculate at base . . . . 1. *T. sagittatum.*
Cauline leaves not auriculate.
  Annual; racemes loose; pods deflexed . . . . 2. *T. lasiophyllum.*
  Biennial; racemes dense; pods spreading.
    Leaves entire or repand . . . . 3. *T. integrifolium.*
    Leaves pinnatifid.
      [illegible] . . . . 4. *T. laciniatum.*
      [illegible] . . . . 5. *T. streptanthoides.*

1. Thelypodium sagittatum (Nutt.) Heller, Bull. Torr. Club **25**: 265. 1898.

Streptanthus sagittatus Nutt. Journ. Acad. Phila. **7**: 12. 1834.

Thelypodium [illegible] S. Wats. Bot. King Explor. **5**: 26. 1871.

TYPE LOCALITY: "On the banks of the Little Goddin river toward the sources of the Columbia." Collected by Wyeth.

RANGE: Washington to Utah and Nevada.

SPECIMENS EXAMINED: North Yakima, *Leiberg*, May 18, 1898; without locality, *Brandegee* 638; without locality, *Vasey* in 1889; Coulee City, *Piper* 3883.

ZONAL DISTRIBUTION: Upper Sonoran.

2. Thelypodium lasiophyllum (Hook. & Arn.) Greene, Bull. Torr. Club **13**: 142. 1886.

Turritis ? lasiophylla Hook. & Arn. Bot. Beech. Voy. 321. 1840.

Sisymbrium reflexum Nutt. Proc. Acad. Phila. **3**: 26. 1848.

TYPE LOCALITY: California.

RANGE: Washington to California.

SPECIMENS EXAMINED: Whatcom County, *Suksdorf* 953.

3. Thelypodium integrifolium (Nutt.) Endl.; Walp. Rep. **1**: 172. 1842.

Pachypodium integrifolium Nutt.; Torr. & Gr. Fl. **1**: 96. 1838.

TYPE LOCALITY: "Elevated plains of the Rocky Mountains, towards the Oregon, as far as Wallawallah." Collected by Nuttall.

RANGE: Washington to California and Nebraska.

SPECIMENS EXAMINED: Yakima City, *Piper*, July, 1897; Coulee City, *Lake & Hull* 473; Satus, *Elmer* 1073; Squaw Creek, *Cotton 874*.

ZONAL DISTRIBUTION: Upper Sonoran.

The "*Thelypodium brachycarpum* Torr.?" of Suksdorf's list is based on a specimen of *T. integrifolium*.

4. Thelypodium laciniatum (Hook.) Endl.; Walp. Rep. **1**: 172. 1842.

Macropodium laciniatum Hook. Fl. Bor. Am. **1**: 43. 1829.

TYPE LOCALITY: "Common on dry rocks about Wallawallah, and at Priest's Rapid on the Columbia." Collected by Douglas.

RANGE: Washington to California and Nevada.

SPECIMENS EXAMINED: Wenache, *Whited* 200, 1246; North Yakima, *Piper*; Pasco, *Piper* 2986; Cascade Mountains, 49°, *Lyall* in 1860; Wallula, *Leckenby*; Crab and Wilson creeks, *Sandberg & Leiberg* 229; Rockland, *Suksdorf* 237; without locality, *Vasey* in 1889; Rock Lake, *Piper* 2792; Walla Walla, *Leckenby*; Douglas County, *Spillman*; Coulee City, *Piper* 3863; Rattlesnake Mountains, *Cotton* 391; Whitman County, opposite Clarkston, *Hunter* 21; Ritzville, *Sandberg & Leiberg* 190.

ZONAL DISTRIBUTION: Upper Sonoran.

5. Thelypodium streptanthoides Leiberg, in herb.

Stout erect from a biennial root, often branched from the base, 0.5 to 1 meter high, glabrous throughout; leaves oblong-lanceolate, irregularly sinuate-toothed or pinnatifid with oblong or even linear lobes, green on both sides, 4 to 10 cm. long, all petioled; racemes dense, 30 to 60 cm. long; sepals becoming 6 to 8 mm. long, deep purple at least on the upper third, somewhat irregular, the lower pair often united for two-thirds of their length, conspicuously saccate at base, becoming tubulose-convolute at apex; petals narrowly linear with a dilated apex, flat, double the length of the sepals; filaments much elongated, nearly equal, free; pods 10 to 12 cm. long, on stout divaricate pedicels 4 to 6 mm. in length, subterete, flexuous or curved, minutely tomentose, strongly nerved; style short or none; mature seeds not seen.

Type specimen in the U. S. National Herbarium, collected near Wilson Creek, Douglas County, altitude 680 meters, no. 229, *Sandberg & Leiberg* in 1893. Also collected on rocky cliffs at Almota, *Piper* 1473 and 3563; Lake Chelan, *Elmer*, July, 1897; and Soap Lake, *McKay* 2.

This species is closely allied to *T. laciniatum* (Hook.) Endl., but differs in its thinner not at all glaucous leaves and purple-tinged calyx.

ERYSIMUM.

Petals 4 to 5 mm. long; pods 1 to 2 cm. long .... 1. *E. cheiranthoides.*
Petals 16 to 24 mm. long.
    Pods 4-angled, spreading, 5 to 12 cm. long.
        Seeds quadrangular .... 2. *E. asperum.*
        Seeds lenticular .... 3. *E. elatum.*
    Pods flattened.
        Cespitose perennial; cotyledons incumbent .... 4. *E. arenicola.*
        Biennial, simple; cotyledons accumbent .... 5. *E. occidentalis.*

1. Erysimum cheiranthoides L. Sp. Pl. **2**: 661. 1753.

TYPE LOCALITY: European.

RANGE: Alaska to Newfoundland, south to Oregon and North Carolina.

SPECIMENS EXAMINED: Wilbur, *Henderson* 2380; Pullman, *Piper* 2820; Clarks Springs, *Kreager* 73.

2. **Erysimum asperum** (Nutt.) DC. Syst. **2**: 505. 1821.

Cheiranthus asper Nutt. Gen. **2**: 69. 1818.

Cheiranthus capitatus Hook. Fl. Bor. Am. **1**: 38. 1829.

TYPE LOCALITY: "On the plains of the Missouri commencing near the confluence of White River." Collected by Nuttall.

RANGE: British Columbia and Saskatchewan, south to California and Texas.

SPECIMENS EXAMINED: Baldy Peak, *Lamb* 1307; Clallam County, *Elmer* 2695; Mount Rainier, *Piper* 2062; Mount Stuart, *Elmer* 1198; 30 miles south of Mount Adams, *Flett* 1733; Wenache, *Whited* 1100, 130; Ritzville, *Sandberg & Leiberg* 182; Spokane, *Piper* 2948; *Henderson*; Soap Lake, *McKay* 8; Wawawai, *Piper*; *Lake & Hull* 474; *Elmer* 77; Almota, *Piper* 1499; Spokane, *Kreager* 161.

ZONAL DISTRIBUTION: Transition and Upper Sonoran.

The types of *Cheiranthus capitatus* were collected "on rocky places of the Columbia, near the sea, and at Puget Sound." They can therefore scarcely be the same as *Erysimum grandiflorum* Nutt., to which *Cheiranthus capitatus* has been referred as a synonym.

3. **Erysimum elatum** Nutt.; Torr. & Gray Fl. **1**: 95. 1838.

Cheiranthus pacificus Sheldon, Bull. Torr. Club **30**: 308. 1903.

TYPE LOCALITY: "Grassy situations by the banks of the Wahlamet." Collected by Nuttall.

RANGE: Washington to California.

SPECIMENS EXAMINED: Waitsburg, *Horner* 82; Cape Horn, *Piper* 5028.

ZONAL DISTRIBUTION: Humid Transition.

4. **Erysimum arenicola** S. Wats. Proc. Am. Acad. **26**: 124. 1891.

TYPE LOCALITY: Mount Steele, Olympic Mountains, Washington, near the summit. Collected by Piper.

RANGE: Known only from the type locality.

SPECIMENS EXAMINED: Olympic Mountains, *Piper* 2179, 916.

ZONAL DISTRIBUTION: Arctic.

5. **Erysimum occidentale** (S. Wats.) Robinson in Gray, Syn. Fl. 1^1: 144. 1895.

Cheiranthus occidentalis S. Wats. Proc. Am. Acad. **23**: 261. 1888.

Erysimum asperum pumilum S. Wats. Bot. King Explor. 24. 1871, not *E. pumilum* DC. 1821.

TYPE LOCALITY: In Washington Territory (Walla Walla, Lyall; Klickitat County, Suksdorf).

RANGE: Washington, Oregon, and Nevada.

SPECIMENS EXAMINED: Ellensburg, *Piper* 2686; North Yakima, *Henderson*, May, 1892; *Mrs. Steinweg* in 1894; *Watt*, August, 1895; *Flett* 1128; Yakima, *Leckenby*, April, 1898; Columbus, *Suksdorf* in 1886; Rockland, *Suksdorf* in 1886; Tampico, *Flett* 1126; Sunnyside, *Cotton* 310; Walla Walla, *Lyall* in 1860; Hunts Junction, *Leckenby*, April, 1898.

ZONAL DISTRIBUTION: Upper Sonoran.

SMELOWSKIA.

Capsule lanceolate, attenuate at each end.............................. 1. *S. calycina*.
Capsule ovate, nearly subcordate at base.............................. 2. *S. ovalis*.

1. **Smelowskia calycina** C. A. Meyer in Ledeb. Fl. Alt. **3**: 170. 1831.

Smelowskia americana Rydberg, Bull. Torr. Club **29**: 239. 1902.

TYPE LOCALITY: Siberia.

RANGE: Alaska to California and Colorado. Siberia.

SPECIMENS EXAMINED: Clallam County, *Elmer* 2696; Mount Adams, *Suksdorf*, September, 1877; Mount Stuart, *Brandegee* 641; *Elmer* 1095.

ZONAL DISTRIBUTION: Arctic.

Smelowskia ovalis Jones, Proc. Cal. Acad. II. **5**: 624. 1895.

TYPE LOCALITY: Mount Adams, Washington.

RANGE: Washington to California.

SPECIMENS EXAMINED: Olympic Mountains, *J. M. Grant* in 1889; Mount Adams, *Henderson*, August, 1892; Mount Rainier, *Piper* 2063; *James Bryce* in 1883; *Allen* 61.

ZONAL DISTRIBUTION: Arctic.

BRASSICA.

- Cauline leaves auricled at base and clasping.......................... 1. *B. campestris.*
- Cauline leaves not auricled or clasping.
  - Beak of the pod very short, less than one-fourth the fertile portion . 2. *B. nigra.*
  - Beak of the pod long, about equaling the fertile portion........... 3. *B. arvensis.*

1. **Brassica campestris** L. Sp. Pl. **2**: 666. 1753. TURNIP.

TYPE LOCALITY: European.

SPECIMENS EXAMINED: Spangle, *Piper*, June, 1899; Waitsburg, *Horner* 73; Pullman, *Hardwick*, July, 1895.

2. **Brassica nigra** (L.) Koch in Roehl. Deutschl. Fl. ed. 3. **4**: 713. 1833. BLACK MUSTARD.

Sinapis nigra L. Sp. Pl. **2**: 668. 1753.

TYPE LOCALITY: European.

SPECIMENS EXAMINED: Pullman, *Piper* 4113; without locality, *Vasey* in 1889.

3. **Brassica arvensis** (L.) B. S. P. Prel. Cat. N. Y. 5. 1888. CHARLOCK.

Sinapis arvensis L. Sp. Pl. **2**: 668. 1753.

Brassica sinapistrum Boiss. Voy. Espagne **2**: 39. 1839-45.

TYPE LOCALITY: "Habitat in agris Europae."

SPECIMENS EXAMINED: Seattle, *Piper*, June, 1891; Pullman, *Piper*, August, 1893; Meyers Falls, *Kreager* 514.

SISYMBRIUM.

- Pubescence of simple hairs or none; leaves pinnatifid.
  - Pods subulate, appressed, 1 to 1.5 cm. long..................... 1. *S. officinale.*
  - Pods linear, spreading, 5 to 10 cm. long......................... 2. *S. altissimum.*
- Pubescence of branched hairs.
  - Flowers white; leaves mainly in a basal rosette................ 3. *S. thalianum.*
  - Flowers yellow; branches leafy.
    - Seeds biseriate in each cell................................ 4. *S. canescens.*
    - Seeds uniseriate in each cell.
      - Leaves tripinnate; herbage canescent................. 5. *S. sophia.*
      - Leaves pinnatifid or bipinnatifid, subglabrous.
        - Capsules 10 to 14 mm. long, spreading.
          - Pedicels 4 to 6 mm. long, shorter than the capsules.................................. 6. *S. incisum.*
          - Pedicels 10 to 20 mm. long, longer than the capsules.................................. 6a. *S. incisum filipes.*
        - Capsules 3 to 6 mm. long on subequal ascending pedicels.. 7. *S. hartwegianum.*

1. **Sisymbrium officinale** (L.) Scop. Fl. Carn. ed. 2. **2**: 26. 1772. HEDGE MUSTARD.

Erysimum officinale L. Sp. Pl. **2**: 660. 1753.

TYPE LOCALITY: European.

SPECIMENS EXAMINED: Pullman, *Hardwick*, August, 1895.

2. **Sisymbrium altissimum** L. Sp. Pl. **2**: 659. 1753. Tumbling mustard.

Type locality: "Habitat in Italia, Gallia, Siberia."

Specimens examined: Whatcom County, *Gardner* 416; Pullman, *Piper* 3513; Wawawai, *Piper*, May 31, 1903.

3. **Sisymbrium thalianum** (L.) Gay, Ann. Sci. Nat. I. **7**: 399. 1826.

Arabis thaliana L. Sp. Pl. **2**: 665. 1753.

Type locality: European.

Specimens examined: Tacoma, *Flett*, May, 1899.

4. **Sisymbrium canescens** Nutt. Gen. **2**: 68. 1818.

Type locality: "From Virginia to Georgia."

Range: Washington to Saskatchewan, Florida, and California.

Specimens examined: Yakima County, *Henderson* 2379; Waitsburg, *Horner* 77; without locality, *Vasey* in 1889.

5. **Sisymbrium sophia** L. Sp. Pl. **2**: 659. 1753.

Type locality: European.

Specimens examined: Pullman, *Piper* 3511; Wawawai, *Piper* 2871; Waitsburg, *Horner* 599.

6. **Sisymbrium incisum** Engelm. in A. Gray, Pl. Fendl. 8. 1849.

Type locality: "Santa Fe Creek and Mora River," New Mexico.

Range: Washington and Manitoba to California and New Mexico.

Specimens examined: Ellensburg, *Piper*, May 21, 1897; Blue Mountains, *Horner* 67; Wenache Mountains, *Cotton* 1286.

6a. **Sisymbrium incisum filipes** A. Gray, Pl. Fendl. 8. 1849.

Sisymbrium longipedicellatum Fourn. Sisymb. 59. 1865.

Sophia filipes Heller, Bull. Torr. Club **24**: 311. 1897.

Type locality: "Clearwater," Idaho. Collected by Spalding.

Range: British Columbia to Nevada.

Specimens examined: Ellensburg, *Whited* 438; North Yakima, *Mrs. Steinweg; Flett* 1129; Tacoma, *Flett* 51; Pasco, *Piper* 2972; Hunts Junction, *Leckenby*, April, 1898; Spokane, *Piper*, May, 1896; Pullman, *Piper* 1477; *Elmer* 842; Almota, *Piper*, May, 1897; Wawawai, *Hull*, May, 1892; *Piper*, May, 1893; Mount Carlton, *Kreager* 145; Coupeville, *Gardner* 20; Wenache, *Whited* 1062, 603; Rattlesnake Mountains, *Cotton* 364; Sunnyside, *Cotton* 356; Cascade Mountains to Colville, *Lyall* in 1860; Rock Lake, *Sandberg & Leiberg* 101; Walla Walla, *Mrs. Anderson* in 1884; Wawawai, *Piper* 1477.

Zonal distribution: Upper Sonoran and Arid Transition.

7. **Sisymbrium hartwegianum** Fourn. Thèse Crucif. 66. 1865.

Sisymbrium incisum hartwegianum Wats. in Brewer & Wats. Bot. Cal. **1**: 41. 1876.

? *Sisymbrium canescens brevipes* Nutt.; Torr. & Gr. Fl. **1**: 92. 1838.

Type locality: "Crescit in imperio mexicano."

Range: British Columbia and Alberta to Mexico.

Specimens examined: Wenache, *Whited* 50; Charleston, *Piper*, June 21, 1895; Pasco, *Piper* 2996; Ritzville, *Sandberg & Leiberg* 161; Morgans Ferry, *Suksdorf* 242; Spokane Valley, *Lyall* in 1861; Myers Falls, *Kreager;* Coulee City, *Piper* 3879, 3880; Republic, *Beattie & Chapman* 2271.

Zonal distribution: Upper Sonoran.

The *Sisymbrium brachycarpon* Richards., in Hooker's Flora, is, in all probability, not that species, but *S. hartwegianum*, so far as the plant from the "Great Falls of the Columbia" is concerned.

SCHOENOCRAMBE.

1. **Schoenocrambe linifolia** (Nutt.) Greene, Pittonia **3**: 127. 1896.
Sisymbrium linifolium Nutt.; Torr. & Gr. Fl. **1**: 91. 1838.
Nasturtium linifolium Nutt. Journ. Acad. Phila. **7**: 12. 1834.
Type locality: "Head of Salmon River, in dry soils," Montana? Collected by Wyeth.
Range: Washington and Montana to Colorado and Arizona.
Specimens examined: Ellensburg, *Whited* 635; *Piper*, May, 1897; *Whited* 398; Klickitat County, *Suksdorf* 3; Wilbur, *Henderson* 2380; Crab and Wilson creeks, *Sandberg & Leiberg* 271; Coulee City, *Piper* 3854; without locality, *Brandegee* 640.
Zonal distribution: Upper Sonoran.

CAMPE.

Pods appressed, 1 to 1.5 cm. long.. 1. *C. stricta.*
Pods ascending, 2.5 to 3 cm. long.. 2. *C. barbarea.*

1. **Campe stricta** (Andrz.) W. F. Wight.
Barbarea stricta Andrz. in Bess. Enum. 72. 1822.
Barbarea vulgaris stricta A. Gray, Man. ed. **2**: 35. 1856.
Type locality: "In Podoliae austr."
Specimens examined: Seattle, *Piper* 754, introduced.

Mr. W. F. Wight has called attention to the fact that the genus name Barbarea of Robert Brown, 1812, is invalidated by reason of the older Barbarea of Scopoli, 1760.

2. **Campe barbarea** (L.) W. F. Wight. Bitter cress.
Erysimum barbarea L. Sp. Pl. **2**: 660. 1753.
Barbarea vulgaris R. Br. in Ait. Hort. Kew. ed. 2. **4**: 109. 1812.
Barbarea barbarea MacMillan, Metasp. Minn. Val. 259. 1892.
Type locality: "Habitat in Europa."
Range: Alaska to Labrador, south to California and Virginia.
Specimens examined: Silverton, *Bouck* 16; west Klickitat County, *Suksdorf* 2022; Klickitat River, *Flett* 1134, 1141; Pend Oreille River, *Lyall* in 1861; Pullman, *Piper*, June 1893; *Elmer* 180; Waitsburg, *Horner* 605.
Zonal distribution: Transition.

The western form of this plant is considered a distinct species by Dr. Rydberg as *Barbarea americana* Rydb.[a] To distinguish it the characters of erect pods and lyrate leaves are relied upon.

SUBULARIA.

1. **Subularia aquatica** L. Sp. Pl. **2**: 642. 1753.
Type locality: "Habitat in Europae borealis inundatis lacustribus fluviis."
Range: British Columbia to Newfoundland, south to California and New England.
Specimens examined: Whatcom Lake, *Suksdorf*.

BURSA.

1. **Bursa bursa-pastoris** (L.) Weber in Wigg. Prim. Fl. Holst. 41. 1780.
Shepherd's purse.
Thlaspi bursa-pastoris L. Sp. Pl. **2**: 647. 1753.
Capsella bursa-pastoris Medic. Pflanzengat. **1**: 85. 1792.
Type locality: European.
A common weed all over the State.

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[a] Mem. N. Y. Bot. Gard. **1**: 174. 1900.

HUTCHINSIA.

1. **Hutchinsia procumbens** (L.) DC. Desv. Journ. Bot. **3**: 168. 1814.
Lepidium procumbens L. Sp. Pl. **2**: 643. 1753.
Capsella elliptica C. A. Meyer in Ledeb. Fl. Alt. **3**: 199. 1831.
Capsella procumbens Fries, Novit. Fl. Suec. Mant. **1**: 14. 1832.
Hymenolobus divaricatus Nutt.; Torr. & Gr. Fl. **1**: 117. 1838.
Hymenolobus erectus Nutt. loc. cit.

TYPE LOCALITY: "Habitat Monspelii."

RANGE: British Columbia to Labrador and southward. Europe. Asia. Australia.

SPECIMENS EXAMINED: Whidby Island, *Gardner* 26; Ellensburg, *Whited*, April, 1897; Rock Lake, *Sandberg & Leiberg* 117; Sunnyside, *Cotton* 315; Coulee City, *Piper* 3890; Lincoln County, *Henderson* 4382; Spokane, *Piper* 2944.

ZONAL DISTRIBUTION: Arid Transition and Upper Sonoran.

CAMELINA.

Glabrous or nearly so; pods 6 to 8 mm. long........................... 1. *C. sativa*.
Pubescent at least below; pods 4 to 6 mm. long........................ 2. *C. microcarpa*.

1. **Camelina microcarpa** Andrcz. in DC. Syst. **2**: 517. 1818.
Camelina sylvestris Wallr. Sched. Crit. 347. 1822.

TYPE LOCALITY: European.

SPECIMENS EXAMINED: Ellensburg, *Whited* 448; Wawawai, *Piper* 1475; Frontier, *Kreager* 465.

2. **Camelina sativa** Crantz, Stirp. Austr. **1**: 18. 1769.

TYPE LOCALITY: Austria.

SPECIMENS EXAMINED: Wilbur, *Henderson*, July, 1892.

LEPIDIUM. PEPPERGRASS.

Apex of the capsules bidentate, the valves strongly reticulated......... 6. *L. dictyotum*.
Apex of the capsules merely emarginate, the valves not reticulated.
  Capsules 4 to 5 mm. long, shining.................................. 5. *L. nitidum*.
  Capsules 2 to 3 mm. long, not shining.
    Petals wanting or very minute.
      Pods glabrous.. 1. *L. apetalum*.
      Pods puberulent.. 2. *L. lasiocarpum*.
    Petals present.
      Basal leaves pinnately parted, pubescent................ 3. *L. menziesii*.
      Basal leaves dentate, glabrous.......................... 4. *L. medium*.

1. **Lepidium apetalum** Willd. Sp. Pl. 3^1: 439. 1800.
Lepidium elongatum Rydberg, Bull. Torr. Club **29**: 234. 1902.

TYPE LOCALITY: "In Siberia."

RANGE: British Columbia to New England and southward. Asia.

SPECIMENS EXAMINED: Wenache, *Whited* 1113; Yakima, *Henderson*, May, 1892; Pasco, *Hindshaw* 13; west Klickitat County, *Suksdorf* 1942. Pasco, *Piper*, May, 1899; Sprague, *Sandberg & Leiberg* 175; Cascade Mountains to Colville, latitude 49°, *Lyall* in 1860; Lake Chelan, *Elmer*, September, 1897; Coulee City, *Piper* 3878, Walla Walla, *Brandegee* 645; Almota, *Piper* 2788; Wawawai, *Piper*, June, 1894, 3064; Pullman, *Piper*, July, 1894, 3507; Clarks Springs, *Kreager* 572; Almota, *Elmer* 21.

ZONAL DISTRIBUTION: Arid Transition and Upper Sonoran.

2. **Lepidium lasiocarpum** Nutt.; Torr. & Gr. Fl. **1**: 115. 1838.

TYPE LOCALITY: "Near St. Barbara, Upper California." Collected by Nuttall.

RANGE: Washington to California and Texas.

SPECIMENS EXAMINED: Charleston, *Piper*, July 21, 1895; Coulee City, *Piper* 3877; between Coulee City and Waterville, *Spillman*, May, 1896.

ZONAL DISTRIBUTION: Upper Sonoran.

3. **Lepidium menziesii** DC. Syst. **2**: 539. 1821.

TYPE LOCALITY: "Hab. in ora occidentali Americae borealis." Collected by Menzies.

RANGE: British Columbia to Oregon, near the seashore principally.

SPECIMENS EXAMINED: Clallam County, *Elmer* 2697; Hoquiam, *Lamb* 1153; Fairhaven, *Piper* 2787; San Juan Island, *Lyall* in 1858; Seattle, *Piper* 444; White Salmon, *Suksdorf* 242; Seattle, *Henderson* 77.

ZONAL DISTRIBUTION: Humid Transition.

This species was formerly confused with *L. virginicum* L., which does not occur in Washington.

4. **Lepidium medium** Greene, Erythea **3**: 36. 1895.

Lepidium intermedium A. Gray, Pl. Wright. **2**: 15. 1853, not Richard.

TYPE LOCALITY: "Ravines of the Organ Mountains, northeast of El Paso," Texas.

RANGE: Washington and Idaho to California and Texas.

SPECIMENS EXAMINED: Lake Cushman, *Henderson* 2045; Cascade Mountains, latitude 49°, *Lyall* in 1859; Bingen, *Suksdorf* 2362; Wawawai, *Lake & Hull* 479; *Piper* 3063, 3533, 3811; Waitsburg, *Horner* 4.

ZONAL DISTRIBUTION: Upper Sonoran.

5. **Lepidium nitidum** Nutt.; Torr. & Gr. Fl. **1**: 116. 1838

TYPE LOCALITY: Near Santa Barbara, California.

RANGE: Washington to California.

SPECIMENS EXAMINED: Klickitat County, *Howell*, June, 1879; Rockland, *Suksdorf* 241; Granddalles, *Gorman*, April, 1895.

ZONAL DISTRIBUTION: Upper Sonoran.

6. **Lepidium dictyotum** A. Gray, Proc. Am. Acad. **7**: 329. 1868.

TYPE LOCALITY: "Nevada, at Steamboat Springs."

RANGE: Washington to Nevada and California.

SPECIMENS EXAMINED: Klickitat County, *Suksdorf* 844; Sprague, *Sandberg & Leiberg* 138; Duck Lake and Crab Creek, *Suksdorf* 244; Walla Walla, *Brandegee* 646; Waitsburg, *Horner* 604; Bolles Junction, *Horner* 607.

ZONAL DISTRIBUTION: Arid Transition.

THLASPI.

Pods large, winged, deeply notched; annual	1. *T. arvense.*
Pods small, scarcely winged or notched; perennials.	
Leaves green, not glaucous	2. *T. alpestre.*
Leaves glaucous	3. *T. glaucum.*

1. **Thlaspi arvense** L. Sp. Pl. **2**: 646. 1753. PENNY CRESS.

TYPE LOCALITY: European.

SPECIMENS EXAMINED: Pullman, *Elmer*, June, 1897.

2. **Thlaspi alpestre** L. Sp. Pl. ed. 2. **2**: 903. 1763.

TYPE LOCALITY: "Habitat in Austria."

RANGE: British Columbia and Montana to Mexico. Europe. Asia.

SPECIMENS EXAMINED: Thirty miles south of Mount Adams, *Flett* 1132; Mount Rainier, *Flett* 227; Mount Stuart, *Elmer* 1210; *Sandberg & Leiberg* 811; Yakima County, *Henderson* 2386; upper Nisqually Valley, *Allen* 300.

ZONAL DISTRIBUTION: Arctic.

3. **Thlaspi glaucum** A. Nelson, Bull. Torr. Club **25**: 275. 1898.

Thlaspi alpestre glaucum A. Nelson, First Rep. Fl. Wyo. 84. 1896.

TYPE LOCALITY: La Plata Mines, Wyoming.

RANGE: Washington, Wyoming.

SPECIMENS EXAMINED: Blue Mountains, *Piper* 2407.

ZONAL DISTRIBUTION: Canadian.

PHYSARIA.

1. **Physaria geyeri** (Hook.) A. Gray, Gen. Ill. **1**: 162. 1848.

Vesicaria geyeri Hook. Lond. Journ. Bot. **6**: 70. *pl. 5.* 1847.

TYPE LOCALITY: "Sunny, sandy declivities on elevated volcanic places, Upper Spokan River." Collected by Geyer.

RANGE: In the vicinity of Spokane, Washington.

SPECIMENS EXAMINED: Spokane Valley, *Lyall* in 1861; upper Spokane River, *Geyer* 476; Spokane, *Henderson* 2384; *Piper* 2293; Marshall Junction, *Piper* 1843; Hangman Creek *Sandberg & Leiberg* 17; Clarks Springs, *Kreager* 117.

ZONAL DISTRIBUTION: Arid Transition.

Hooker [a] at first included this species in his *Vesicaria didymocarpa*, and this is perhaps the basis for the inclusion of *Physaria didymocarpa* (Hook.) Gray in Suksdorf's list.

NESLIA.

1. **Neslia paniculata** (L.) Desv. Journ. Bot. **3**: 162. 1814.

Myagrum paniculatum L. Sp. Pl. **2**: 641. 1753.

TYPE LOCALITY: "Habitat in Europa, juxta agros."

SPECIMENS EXAMINED: Frontier, *Kreager* 467.

ATHYSANUS.

1. **Athysanus pusillus** (Hook.) Greene, Bull. Cal. Acad. **1**: 72. 1885.

Thysanocarpus pusillus Hook. Ic. Pl. *pl. 42.* 1837.

Thysanocarpus oblongifolius Nutt.; Torr. & Gr. Fl. **1**: 118. 1838.

TYPE LOCALITY: Monterey, California. Collected by Douglas.

RANGE: British Columbia to Idaho and California.

SPECIMENS EXAMINED: Tacoma, *Flett* 885; Rock Creek, *Sandberg & Leiberg* 96; without locality, *Vasey* in 1889; Pullman, *Elmer* 124; *Piper* 1481; *Hull*, May, 1892.

ZONAL DISTRIBUTION: Transition.

THYSANOCARPUS.

1. **Thysanocarpus curvipes** Hook. Fl. Bor. Am. **1**: 69. 1830.

Thysanocarpus trichocarpus Rydberg, Bull. Torr. Club **30**: 253. 1903.

TYPE LOCALITY: "On moist ground, near the Great Falls of the Columbia." Collected by Douglas.

RANGE: Washington and Idaho to California and Arizona.

SPECIMENS EXAMINED: West Klickitat County, *Suksdorf*, April 30, 1886; Rock Lake, *Sandberg & Leiberg* 118; Wawawai, *Lake* 478; *Piper* 1480 in part, April, 1897; Waitsburg, *Horner* 76 in part; without locality, *Vasey* 187.

ZONAL DISTRIBUTION: Upper Sonoran and Arid Transition.

1a. **Thysanocarpus curvipes madocarpus** subsp. nov.

Differs from the species in having its pods glabrous instead of puberulent.

From field observations this seems worthy of subspecific rank. While both forms may occur close together, yet so far as my observations go a particular colony of plants is of one form or the other; the two do not occur mixed.

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[a] Fl. Bot. Am. **1**: 49. 1830.

Mr. M. L. Fernald kindly examined the type of *T. curvipes* in the British Museum and writes that the pods are puberulent, a point not brought out in the original description.

Specimens examined: Pullman, *Elmer*, 79 (type); Wawawai, *Piper* 1480 in part; Spokane, *Henderson*, June, 1892; Tacoma, *Flett* 886; near Clarkston, *Hunter* 49; Waitsburg, *Horner* 76 in part.

RAPHANUS.

Pods grooved, 4 to 10-seeded.. 1. *R. raphanistrum.*
Pods not grooved, 2 or 3-seeded.. 2. *R. sativus.*

1. **Raphanus raphanistrum** L. Sp. Pl. 2: 669. 1753.

Type locality: "Habitat inter segetes Europae."

Specimens examined: Pullman, *Piper* 4214.

2. **Raphanus sativus** L. Sp. Pl. 2: 669. 1753. Radish.

Type locality: Not given.

Specimens examined: Whidby Island, *Gardner* 18.

Conringia perfoliata (L.) Link has been collected in Douglas County by Sandberg & Leiberg (no. 314). It can scarcely be said to be established.

CAPPARIDACEAE. Caper Family.

CLEOME.

Flowers yellow.. 1. *C. lutea.*
Flowers purple.. 2. *C. serrulata.*

1. **Cleome lutea** Hook. Fl. Bor. Am. 1: 70. 1830.

Type locality: "Common in North-West America; on the banks of the Columbia; and in the vallies of the Blue Mountains, sparingly; and as far as to the Rocky Mountains." Collected by Douglas.

Range: Washington to Nevada and Colorado.

Specimens examined: Wenache, *Whited* 1152; North Yakima, *Watt*, August, 1895; *Piper* 1805; *Flett* 1036; Egbert Springs, *Sandberg & Leiberg* 405; Snipes Mountain, *Cotton* 375; without locality, *Vasey* in 1889; Hangman Creek, *Sandberg, Heller, & McDougal* 907.

Zonal distribution: Upper Sonoran.

2. **Cleome serrulata** Pursh, Fl. 2: 441. 1814.

Cleome integrifolia Torr. & Gr. Fl. 1: 122. 1838.

Type locality: "On the banks of the Missouri." Collected by Lewis.

Range: Washington to Saskatchewan, New Mexico, and Arizona.

Specimens examined: Ellensburg, *Whited* 570; North Yakima, *Watt*, August, 1895.

Zonal distribution: Upper Sonoran.

Polanisia trachysperma Torr. & Gr. appears in Suksdorf's list. There are no herbarium specimens of this plant from Washington to justify its inclusion in the flora.

DROSERACEAE. Sundew Family.

DROSERA.

Leaf blades round, long-petioled.................................... 1. *D. rotundifolia.*
Leaf blades spatulate.. 2. *D. longifolia.*

1. **Drosera rotundifolia** L. Sp. Pl. 1: 281. 1753. Sundew.

Type locality: "Habitat in Europae, Asiae, Americae paludibus."

Range: Alaska to Labrador, southward to California and Florida. Europe. Asia.

Specimens examined: Clallam County, *Elmer* 2785; Seattle, *Piper* in 1888; Tacoma, *Flett* 318; Falcon Valley, *Suksdorf* 370; Ilwaco, *Henderson;* Davis Lake, *Kreager* 437.

Zonal distribution: Humid Transition.

2. **Drosera longifolia** L. Sp. Pl. **1**: 282. 1753.
Drosera anglica Huds. Fl. Angl. 135. 1778.
TYPE LOCALITY: "Habitat in Europa ubique."
RANGE: Subarctic regions, southward to Newfoundland, Idaho, and California. Europe. Asia.
SPECIMENS EXAMINED: Mount Adams, *Henderson;* Falcon Valley, *Suksdorf* 371.
ZONAL DISTRIBUTION: Canadian.

CRASSULACEAE. STONECROP FAMILY.

Flowers solitary axillary; annual .... TILLAEASTRUM.
Flowers cymose; perennials or biennials.
  Leaves serrate; flowers purple .... RHODIOLA.
  Leaves entire; flowers yellow.
    Petals free to the base .... SEDUM.
    Petals united below the middle .... GORMANIA.

1. TILLAEASTRUM.

Leaves obtuse; pedicels as long as the leaves .... 1. *T. drummondii.*
Leaves acute; pedicels very short .... 2. *T. aquaticum.*

1. **Tillaeastrum drummondii** (Torr. & Gr.) Britton, Bull. N. Y. Bot. Gard. **3**: 1. 1903.
Tillaea drummondii Torr. & Gr. Fl. **1**: 558. 1840.
TYPE LOCALITY: Texas. Collected by Drummond.
RANGE: Washington to California and Louisiana.
SPECIMENS EXAMINED: Lake Chelan, *Gorman* 693.

2. **Tillaeastrum aquaticum** (L.) Britton, Bull. N. Y. Bot. Gard. **3**: 1. 1903.
Tillaea aquatica L. Sp. Pl. **1**: 128. 1753.
Tillaea angustifolia Nutt. Torr. & Gr. Fl. **1**: 558. 1840.
TYPE LOCALITY: European.
RANGE: Washington to Nova Scotia, southward to Lower California, Texas, and Maryland. Europe.
SPECIMENS EXAMINED: Parker, *Elmer*, July, 1898.

RHODIOLA.

1. **Rhodiola integrifolia** Raf. Atl. Journ. **1**: 146. 1832.
Sedum frigidum Rydberg, Bull. Torr. Club **28**: 282. 1901.
TYPE LOCALITY: "On the Rocky Mountains."
RANGE: Alaska to California and Colorado.
SPECIMENS EXAMINED: Cascade Mountains, latitude 49°, toward Fort Colville, *Lyall* in 1860; Mount Adams, *Suksdorf* 547, 859; Mount Stuart, *Brandegee* 773.

SEDUM. STONECROP.

Leaves spatulate, very glaucous .... 1. *S. spathulifolium.*
Leaves not spatulate nor glaucous.
  Leaves subglobose, bright green .... 2. *S. divergens.*
  Leaves lanceolate, broadest at base.
    Leaves becoming scarious; carpels divergent .... 3. *S. douglasii.*
    Leaves not becoming scarious.
      Perennial, carpels erect .... 4. *S. stenopetalum.*
      Biennial, carpels divaricate .... 5. *S. leibergii.*

1. **Sedum spathulifolium** Hook. Fl. Bor. Am. **1**: 227. 1834.
TYPE LOCALITY: "Common on dry rocky places of the Columbia and Salmon Rivers." Collected by Douglas.

RANGE: British Columbia to northern California in the coast region.

SPECIMENS EXAMINED: Clallam County, *Elmer* 2691; Whidby Island, *Gardner* 121; Fidalgo Island, *Flett* 2115; west Klickitat County, *Suksdorf* 548; mouth of Columbia, *Douglas* 1825; Stuart Island, *Lawrence* 12.

ZONAL DISTRIBUTION: Humid Transition.

2. **Sedum divergens** S. Wats. Proc. Am. Acad. **17**: 372. 1882.

TYPE LOCALITY: "In the Cascade Mountains, Washington Territory; on Mount Adams and near the summit of Yakima Pass." Collected by Suksdorf and by Watson.

RANGE: British Columbia to Oregon.

SPECIMENS EXAMINED: Olympic Mountains, *Piper* 2221; Mount Rainier, *Piper* in 1895; Mount Adams, *Suksdorf* 369; *Henderson* 4; Mount Stuart, *Brandegee* 774; *Elmer* 1181; *Sandberg & Leiberg* 809; Yakima Pass, *Watson* 142; Stampede Pass, *Henderson*, July 27, 1892; Horseshoe Basin, *Elmer* 856.

ZONAL DISTRIBUTION: Canadian and Hudsonian.

3. **Sedum douglasii** Hook. Fl. Bor. Am. **1**: 228. 1834.

Sedum uniflorum Howell, Fl. N. W. Am. **1**: 213. 1898.

TYPE LOCALITY: "Common on rocky places of the Columbia to the mountains." Douglas.

RANGE: British Columbia and Idaho to California.

SPECIMENS EXAMINED: Mount Adams, *Flett* 1206; Tieton River, *Cotton* 486; Fort Colville, *Watson*; Loon Lake, *Winston*, July 20, 1897; Spokane, *Henderson* 2572; *Piper;* Spokane County, *Suksdorf* 302; Blue Mountains, *Lake & Hull* 442; Palouse, *Cloud;* Spokane, *Kreager* 6; Olympic Mountains, *Flett* 116.

ZONAL DISTRIBUTION: Arid Transition.

Sedum uniflorum Howell is apparently only a weak state of the species, having solitary or few flowers.

4. **Sedum stenopetalum** Pursh, Fl. **1**: 324. 1814.

TYPE LOCALITY: "On rocks on the banks of Clark's River [Montana] and Kooskoosky" [Idaho]. Collected by Lewis.

RANGE: British Columbia to Montana and Oregon.

SPECIMENS EXAMINED: Olympic Mountains, *Flett* 138; east side Cascade Mountains, latitude 49°, *Lyall* in 1860; San Juan County, *Gardner*, June 23, 1899; East Sound, *Henderson* in 1892; Mount Stuart, *Sandberg & Leiberg* 555; Ellensburg, *Elmer* 416; near Ellensburg, *Whited* 540; Laconner, *Gardner*; Twisp River, *Whited* 237; without locality, *Vasey* in 1889; Blue Mountains, *Horner* 409; Stehekin, *Griffiths & Cotton* 209; Flat Top Island, *Lawrence* 114.

ZONAL DISTRIBUTION: Transition.

5. **Sedum leibergii** Britton, N. Am. Fl. **22**¹:73. 1905.

Sedum divaricatum S. Wats. Proc. Am. Acad. **17**:372. 1882, not Aiton, 1789.

TYPE LOCALITY: "In Union County, Oregon." Collected by Cusick.

RANGE: Washington, Idaho, and Oregon.

SPECIMENS EXAMINED: Klickitat County, *Howell*, June, 1879; Wawawai, *Henderson* 2571; *Hull* 442; *Elmer* 762; *Piper;* Rattlesnake Mountains, *Cotton* 703.

ZONAL DISTRIBUTION: Arid Transition.

GORMANIA.

1. **Gormania oregana** (Nutt.) Britton, Bull. N. Y. Bot. Gard. **3**: 30. 1903.

Sedum oreganum Nutt.; Torr. & Gr. Fl. **1**: 559. 1840.

TYPE LOCALITY: "Rocks, near the mouth of the Oregon." Collected by Nuttall.

RANGE: Oregon and Washington.

SPECIMENS EXAMINED: Silverton, *Bouck* 75; Whatcom County, *Gardner* 420; Cascade Mountains, latitude 49°, *Lyall* in 1859; Columbia River, Cascade Mountains, *Suksdorf*

126?; Columbia River, *Nuttall* (type); Mashel Canyon, *Piper* 2123; Stampede Pass, *Henderson*, July 27, 1892; Horseshoe Basin, *Lake & Hull* 443; without locality, *Cooper*.

ZONAL DISTRIBUTION: Canadian and Humid Transition.

SAXIFRAGACEAE. SAXIFRAGE FAMILY.

- Staminodia none; carpels 2, distinct, at least above .... PARNASSIA (p. 322).
- Staminodia present; carpels 3 or 4, united.
  - Placentae axial.
    - Carpels distinct; leaves coriaceous, without stipules .. LEPTARRHENA (p. 310)
    - Carpels united, at least below.
      - Stamens 10 .... SAXIFRAGA (p. 312).
      - Stamens 5.
        - Ovary superior .... BOLANDRA (p. 310).
        - Ovary not superior.
          - Rootstocks bearing bulblets; ovary almost wholly inferior .... HEMIEVA (p. 311).
          - Rootstocks not bearing bulblets; ovary half-inferior .... THEROFON (p. 311).
      - Petals none; stamens 8 .... CHRYSOSPLENIUM (p. 318).
  - Placentae parietal or nearly basal.
    - Stamens 8 or 10.
      - Petals present; stamens 10.
        - Carpels unequal; petals entire .... TIARELLA (p. 317).
        - Carpels equal; petals laciniate .... TELLIMA (p. 317).
    - Stamens 5 or 3.
      - Petals pinnatifid; stamens 5 .... MITELLA (p. 319).
      - Petals entire or none.
        - Stamens 5; calyx campanulate or turbinate. HEUCHERA (p. 320).
        - Stamens 3; calyx tubular .... LEPTAXIS (p. 322).

LEPTARRHENA.

1. **Leptarrhena amplexifolia** (Sternb.) Ser. in DC. Prod. **4**: 48. 1830.

Saxifraga amplexifolia Sternb. Rev. Sax. Suppl. **1**: 2. *pl. 2*. 1822.

Saxifraga pyrolifolia D. Don, Trans. Linn. Soc. **13**: 389. 1822.

Leptarrhena pyrolifolia Ser. in DC. Prod. **4**: 48. 1830.

TYPE LOCALITY. Unalaska.

RANGE: Alaska to Mount Adams, Washington, and Kootenai Pass, British Columbia.

SPECIMENS EXAMINED: Olympic Mountains, *Piper*, August, 1895, Mount Ranier, *Flett* 255; *Piper* 2039, *Allen* 281; Mount Adams, *Henderson*, August, 1892; *Suksdorf* 543, Cascade Mountains, latitude 49°, *Lyall* in 1859; Stevens Pass, *Sandberg & Leiberg* 711; Bridge Creek, *Elmer* 658; without locality, *Vasey* in 1889.

ZONAL DISTRIBUTION: Arctic.

BOLANDRA.

1. **Bolandra oregana** S. Wats. Proc. Am. Acad. **14**: 292. 1879.

TYPE LOCALITY. "On wet rocky banks of the Willamette River, near Oregon City, Oregon." Collected by Howell.

RANGE. Oregon and Washington.

SPECIMENS EXAMINED: White Salmon River, *Suksdorf* in 1882; Cape Horn, *Piper* 5021.

ZONAL DISTRIBUTION: Humid Transition.

THEROFON.

Stipules scarious or foliaceous.. 1. *T. majus.*
Stipules represented by bristles.. 2. *T. elatum.*

1. **Therofon majus intermedium.**
Boykinia major intermedia Piper, Erythea **7**: 172. 1899.
Therofon intermedium Heller, Muhlenbergia **1**: 53. 1904.
TYPE LOCALITY: New London, Chehalis County, Washington. Collected by Lamb.
RANGE: Known only from the type.
SPECIMENS EXAMINED: New London, *Lamb* 1267.

2. **Therofon elatum** (Nutt.) Greene, Man. Bay Reg. 121. 1894.
Saxifraga elata Nutt. in Torr. & Gr. Fl. **1**: 575. 1840.
Boykinia occidentalis Torr. & Gr. Fl. **1**: 577. 1840.
Boykinia elata Greene, Fl. Fran. 190. 1891.
Boykinia nuttallii J. M. Macoun, Can. Rec. Sci. **6**: 409. 1895.

TYPE LOCALITY: "In wet places near Chenook Point at the estuary of the Oregon." Collected by Nuttall.

RANGE: British Columbia to south California, along the coast.

SPECIMENS EXAMINED: Olympic Mountains, *Piper* 2209; Quilcene, *Gardner* 109; Snoqualmie, *Parker*, August, 1892; *Piper* in 1889; *Smith* in 1889; Silverton, *Bouck*; Nisqually Valley, *Allen* 118a.

ZONAL DISTRIBUTION: Canadian.

Rydberg,[a] considers this distinct from *T. elatum* under the name of *Therofon occidentale*. A careful reexamination of the above material and much more leaves our previous conclusion unchanged. The plant of California, *T. cincinnatum* Rosendahl & Rydberg loc. cit., is feebly distinguishable by a larger inflorescence with the branches more or less racemiform and curved pedicels. This is said to range from Washington to California, but we have seen specimens only from California.

HEMIEVA.

Petals violet, long-clawed.. 1. *H. violacea.*
Petals white, short-clawed.. 2. *H. ranunculifolia.*

1. **Hemieva violacea** (A. Gray) Wheelock, Bull. Torr. Club **23**: 71. 1896.
Suksdorfia violacea A. Gray, Proc. Am. Acad. **15**: 42. 1879.

TYPE LOCALITY: "Wet rocks of the Columbia River in Washington Territory, near the junction of the White Salmon River."

SPECIMENS EXAMINED: West Klickitat County, *Suksdorf* 68; April, 1878; April 29, 1882.

According to Professor Greene there are specimens in the British Museum collected by Douglas at Kettle Falls.

2. **Hemieva ranunculifolia** (Hook.) Raf. Fl. Tell. **2**: 70. 1836.
Saxifraga ranunculifolia Hook. Fl. Bor. Am. **1**: 246. *pl. 83.* 1833.
Suksdorfia ranunculifolia Engler in Engl. & Prantl, Nat. Pflanzenfam. 3^{2a}: 52. 1891.

TYPE LOCALITY: "On the high grounds around the Kettle Falls of the Columbia, and on the Rocky Mountains." Collected by Douglas.

RANGE: British Columbia to North California and east to North Idaho.

SPECIMENS EXAMINED: Mount Rainier, *Piper* 2033; Goat Mountains, *Allen* 201; Mount Adams, *Suksdorf* 297; *Howell* in 1882; Klickitat River, *Flett* 1310; Stevens Pass, *Sandberg & Leiberg* 791; Bridge Creek, *Elmer* in 1897.

ZONAL DISTRIBUTION: Hudsonian.

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[a] N. Am. Fl. **22**: 123. 1905.

SAXIFRAGA. Saxifrage.

Stems producing perennial branches, these densely beset with small leaves.
Leaves coriaceous and evergreen, entire.
Filaments clavate; leaves spatulate, obtuse, not ciliate.... 1. *S. tolmiei.*
Filaments subulate; leaves lanceolate, acute, ciliate .... 2. *S. bronchialis.*
Leaves not coriaceous thin, 3 to 5-lobed or cleft.
Calyx united only at base; leaves cleft .... 3. *S. cespitosa.*
Calyx united to the middle; leaves lobed.............. 4. *S. adscendens.*
Stems not producing perennial leafy branches.
Calyx campanulate; stems leafy; basal leaves crenate; cauline few, entire or 3-lobed .... 5. *S. debilis.*
Calyx rotate; leaves all or mostly basal.
Leaves serrate or coarsely dentate.
Petals dissimilar; leaves spatulate, serrate, short-petioled.. 9. *S. bongardi.*
Petals similar; leaves cordate or reniform, coarsely toothed, long-petioled.
Caudex bulbous; herbage somewhat glandular; leaves usually doubly dentate.................. 6. *S. mertensiana.*
Caudex not bulbous; leaves glabrous, simply dentate.
Petals spatulate-obovate...................... 7. *S. odontophylla*
Petals elliptic, not clawed.................... 8. *S. nelsoniana.*
Leaves entire or merely crenate, all basal.
Leaves ovate or oblong, petioled, usually coarsely crenate.
Leaves thick, subcoriaceous, red-tomentose beneath at least when young.......................... 10. *S. marshallii.*
Leaves not subcoriaceous, often thin, glabrous or nearly so....................................... 11. *S. californica.*
Leaves entire or nearly so, oblong-spatulate to ovate.
Calyx lobes erect, shorter than the tube; petals wanting....................................... 17. *S. apetala.*
Calyx lobes spreading, about as long as the tube; petals present.
Petals not exceeding the calyx lobes.
Petals obovate........................... 12. *S. plantaginea.*
Petals narrowly oblong.................. 13. *S. columbiana.*
Petals much longer than the calyx lobes.
Stems 30 to 60 cm. tall; flowers 7 to 9 mm. broad; leaves without petioles.... 14. *S. oregana.*
Stems 10 to 30 cm. high; flowers smaller; leaves more or less distinctly petioled.
Flowers 6 to 8 mm. broad; leaves elliptic, villous and viscid above..... 15. *S. integrifolia*
Flowers 3.5 to 5 mm. broad; leaves usually broadly ovate; petals persistent........................... 16. *S. fragosa.*

1. **Saxifraga tolmiei** Torr. & Gr. Fl. **1**: 567. 1840.

Type locality: "Northwest coast." Collected by Tolmie.

Range: Washington and Oregon in the Cascade and Olympic Mountains.

Specimens examined: Olympic Mountains, *Piper*, August, 1895; *Elmer* 2642; Mount Rainier, *Allen* 99; *Smith* in 1890; *Piper* 2038; Mount Adams, *Henderson*, August, 1892; *Flett* 1317; *Suksdorf* in 1877; Bridge Creek, *Elmer* 635.

Zonal distribution: Arctic.

The specific name of this plant in the original publication was spelled *tolmaei*, evidently a typographical error.

2. **Saxifraga bronchialis** L. Sp. Pl. **1**: 400. 1753.

Saxifraga austromontana Wiegand, Bull. Torr. Club **27**: 389. 1900.

Saxifraga cognata E. Nelson, Bot. Gaz. **30**: 118. 1900.

Type locality: Siberia.

Range: Alaska to Oregon and New Mexico; also Siberia and Russia.

Specimens examined: Olympic Mountains, *Piper* 2210; Baldy Peak, *Lamb* 1312; Whidby Island, *Gardner* 115; Mount Constitution, *Henderson*, July, 1892; Mount Rainier, *Piper* 2036 and August, 1888; *Smith* 348; Goat Mountains, *Allen* 197; Cascade Mountains, latitude 49°, *Lyall* in 1859; between Colville and the Cascade Mountains, latitude 49°, *Lyall* in 1860; Mount Adams, *Suksdorf* 11; *Henderson*, July, 1892; Stevens Pass, *Sandberg & Leiberg* 763; Loomis, *Elmer* 583; without locality, *Vasey* in 1889; Cape Horn, *Piper* 4972.

Zonal distribution: Hudsonian and Arctic.

Two forms of this variable species occur in Washington, both with white flowers. The alpine form has acute or acuminate leaves, while the plant common on the cliffs along the Columbia River and in Island County has thinner obtuse or obtusish leaves and larger corymbs. Mr. Howell has referred the latter form to *S. cherlerioides* D. Don, with which, however, it is not identical.

Small[a] recognizes *Saxifraga austromontana* Wiegand as valid (*Leptasea austromontana* Small, loc. cit.) and describes the second form mentioned above as *Leptasea vespertina*. *Saxifraga bronchialis* L. as generally accepted is a polymorphic species and the above are, as we believe, mere subspecies at best. Intergrading forms occur. They may be designated, however, *Saxifraga bronchialis austromontana* and *S. bronchialis vespertina*. The type of the latter is Lamb's 1312.

3. **Saxifraga cespitosa** L. Sp. Pl. **1**: 404. 1753.

Type locality: North European.

Range: Subarctic regions, south to Quebec, Colorado, and Oregon. Europe. Asia.

Specimens examined: Olympic Mountains, *Piper* 2211; *Elmer* 2649; *Flett* 809; Mount Stuart, *Brandegee* 759; *Elmer* 1102; Goat Mountains, *Allen* 200; Mount Rainier, *Flett* 2176 258; Johns Island, *Lawrence* 194; Mount Storm King, *Lawrence* 343; Orcas Island, *Henderson*, July, 1892; Lopez Island, *Lyall* in 1858; Eatonville, *Flett* 2213.

Two forms of this variable species occur in our limits, one high alpine, densely cespitose, the leaves with short obtuse lobes and obscure veins; the other from cliffs along the Columbia River and the San Juan Islands, with thinner prominently veined leaves and a taller looser habit. The latter approaches closely *S. caespitosa laxa* Koch. The former is scarcely matched in European material. This has recently been proposed as a new species by Small[b] under the name *Muscaria emarginata*, the type being Elmer's 2649. This plant is, however, much nearer to true *S. cespitosa* than the thin-leaved form. Both are mere subspecies in our judgment.

4. **Saxifraga adscendens** L. Sp. Pl. **1**: 405. 1753.

Type locality: "Habitat in Pyrenaeis, Baldo, Tauro Rastadiensi."

Range: British Columbia to Washington, Colorado, and Hudson Bay. Europe.

Specimens examined: Mount Baker, *Flett* 855.

5. **Saxifraga debilis** Engelm.; Porter & Coulter, Fl. Colo. 38. 1874.

Type locality: Colorado.

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[a] N. Am. Fl. **22**²: 153. 1905.

[b] N. Am. Fl. **22**²: 129. 1905.

RANGE: Washington to Montana and Colorado.

SPECIMENS EXAMINED: Mount Rainier, *Allen*, August 20, 1895.

6. **Saxifraga mertensiana** Bong. Mem. Acad. St. Petersb. VI. **2**: 141. 1832.

Saxifraga heterantha Hook. Fl. Bor. Am. **1**: 252. 1833.

TYPE LOCALITY: "Sitcha," Alaska.

RANGE: Alaska to Idaho and the Blue Mountains; north California.

SPECIMENS EXAMINED: Clallam County, *Elmer* 2643; Chehalis County, *Lamb* 1348; Cascade Mountains, latitude 49°, *Lyall* in 1859; Mount Rainier, *Allen* 17; Goat Mountains, *Allen* 241; Falcon Valley, *Suksdorf* 14; rocks of the Columbia, *Nuttall*; Blue Mountains, *Horner*; Cape Disappointment, *Scouler*.

ZONAL DISTRIBUTION: Canadian.

Small[a] considers that two species have been confused under the above, which he distinguishes as *Heterisia mertensiana* and *H. eastwoodiae*, the former with bulblets in the inflorescence, the latter without. Both occur in Washington, and careful field study is needed to determine if the character relied upon is really specific.

7. **Saxifraga odontophylla** sp. nov.

Perennial by stout rootstocks, not bulbous, entirely glabrous up to the inflorescence; leaves all basal, reniform-orbicular, somewhat fleshy, coarsely and evenly dentate with 15 to 25 teeth, 2 to 8 cm. broad; petioles usually 2 to 3 times as long as the blade; scapes 10 to 40 cm. high; inflorescence a loose, erect panicle, glandular; bracts linear, the lower more or less dentate or occasionally foliaceous; pedicels slender; calyx 5-parted, the lobes oval, obtuse, 2 mm. long, reflexed in anthesis; petals white, orbicular and unguiculate, longer than the calyx; filaments spatulate, acuminate; ovary free; capsules usually purple, somewhat inflated, 7 to 8 mm. long, cleft to the middle, the beaks becoming divaricate.

This species has long passed in American herbaria as *S. punctata* L., a rare European species. Among American species it can only be confused with *S. nelsoniana* Don, which is a smaller plant with lobed rather than dentate leaves, pubescent stems and inflorescence, elliptical unclawed petals, and a more or less condensed flower cluster. *S. odontophylla* ranges from British Columbia to New Mexico and California.

SPECIMENS EXAMINED: Olympic Mountains, *Piper* 2213; *Elmer* 2639; Mount Rainier, *Piper* 2025; *Flett* 236, 278; Cascade Mountains, latitude 49°, *Lyall*; Cascade Mountains above Stampede Tunnel, *Henderson* in 1892; Mount Adams, *Suksdorf* 544; Wenache Mountains, *Whited* 255; Silverton, *Bouck* 72a; Mount Stuart, *Sandberg & Leiberg* 570 (type); Stevens Pass, *Sandberg & Leiberg*, August, 1893; Blue Mountains, *Piper*, July 17, 1896; above Lake Chelan, *Wilcox* in 1883; without locality, *Vasey* in 1889.

ZONAL DISTRIBUTION: Arctic and Hudsonian.

The type is in the National Herbarium, sheet no. 289646.

8. **Saxifraga nelsoniana** D. Don, Trans. Linn. Soc. **13**: 355. 1822.

Saxifraga punctata nelsoniana Engler, Verh. Zool. Bot. Ges. Vienna **19**: 548. 1869.

TYPE LOCALITY: Cape Newnham, Alaska.

RANGE: Alaska to Washington.

SPECIMENS EXAMINED: Olympic Mountains, *Piper* 2214; *Elmer* 2640; Mount Rainier, *Allen* 16; *Piper* 2040; *Smith*, August, 1890; Cascade Mountains, latitude 49°, *Lyall* in 1859; Stevens Pass, *Piper*, July 7, 1895; Horseshoe Basin, *Lake & Hull*, August 24, 1892; Bridge Creek, *Elmer* 716.

The Lyall specimen is peculiar and is referred here with doubt. It has the leaves doubly dentate, scarcely cordate, pubescent on each side, perhaps viscid. It may be referable perhaps to *S. mertensiana*.

ZONAL DISTRIBUTION: Arctic.

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[a] N. Am. Fl. 22^2: 156. 1905.

9. **Saxifraga bongardi** Presl, Verh. Zool. Bot. Ges. Vienna **19**: 528. 1869.

Saxifraga stellaris brunoniana Bong. Mem. Acad. St. Petersb. VI. **2**: 140. 1831, not *Saxifraga brunnoniana* Wall.

Saxifraga leucanthemifolia brunoniana Engler, Monog. Sax. 135. 1872.

Saxifraga notkana Moc.; Small, Bull. Torr. Club **23**: 368. 1896.

TYPE LOCALITY: "Sitka."

RANGE: Alaska to Oregon in the Cascade Mountains and westward.

SPECIMENS EXAMINED: Olympic Mountains, *Elmer* 2644; Cascade Mountains, latitude 49 , *Lyall* in 1859; Mount Rainier, *Piper* 2026, 446; *Smith*, August, 1889; *Allen* 49; Goat Mountains, *Allen* 199; Mount Adams, *Suksdorf* 542, 363; Klickitat River, *Flett* 1316; Silverton, *Bouck* 69; mountains north of Ellensburg, *Brandegee* 760; Skamania County, *Suksdorf* 2500; Bridge Creek, *Elmer* 691; Horseshoe Basin, *Lake & Hull* 468; Stevens Pass, *Sandberg & Leiberg*, August, 1893; Nason Creek, *Sandberg & Leiberg* 657.

ZONAL DISTRIBUTION: Arctic.

This species is allied to *S. stellaris* L. and has often been thus referred.

10. **Saxifraga marshallii** Greene, Pittonia **1**: 159. 1888.

Saxifraga occidentalis S. Wats. Proc. Am. Acad. **23**: 264. 1888.

TYPE LOCALITY: "On damp rocky hillsides, Hoopa Valley, Humboldt County, California."

RANGE: British Columbia and Alberta to California.

SPECIMENS EXAMINED: Mount Rainier, *Piper* 2034*; Goat Mountains, *Allen* 242*; Wenache region, *Brandegee* 757*; Olympic Mountains, *Piper* 2212; *Elmer* 2646; lower Cascade Mountains, Skamania County, *Suksdorf* 967; White Salmon, *Suksdorf* 269; Goat Mountains, *Allen*, July 22, 1896; Mount Baker, *Flett* 857; Cape Horn, *Piper* 4969.

ZONAL DISTRIBUTION: Arctic and in the Columbia Gap.

The specimens marked with an asterisk agree with the type of *S. occidentalis* in having clavate filaments. The remaining specimens are very similar in all other respects but have subulate filaments. Watson included both forms in his original account of the species. If the filament character proves to be a real specific distinction, as may indeed be the case, we shall have two species of remarkable similarity. The form with subulate filaments is allied to *S. nivalis* L., under which name it has been distributed. The form from the Columbia Gap was referred in Hooker's Flora to *S. vernalis* Willd., and in Suksdorf's List to *S. reflexa* Hook.

Besides the above specimens a few others have been examined, evidently closely allied to *S. marshallii*, but which we hesitate to refer there, namely: Wenache Mountains, *Whited* 1040; Admiralty Head, *Oscar Piper*; Blue Mountains, *Piper*, July, 1896.

The whole group is in need of critical revision.[a]

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[a] In the recent treatment of Saxifraga by Small in the North American Flora five species are recognized under the generic name Micranthes in what I have here referred to *S. marshallii*. The following characters are relied upon to distinguish them:

Filaments subulate . . . . *M. rufidula* Small.
Filaments clavate or spatulate.
  Petals bimaculate . . . . *M. marshallii* (Greene).
  Petals wholly white.
    Cymules permanently compact.
      Petals rounded at apex; species of northern Rocky Mountains . . . . *M. occidentalis* (S. Wats.).
      Petals notched at apex; species of the Northwest . . *M. allenii* Small.
    Cymules lax and open.
      Petals notched at the apex . . . . *M. aequidentata* Small.

The value of the above characters will have to be determined by careful field study and larger series of material. *M. rufidula* Small is probably a valid species, and according to the above characters will include all of the specimens above not marked with an asterisk. It may be remarked that this embraces most of the specimens from the bluffs of the

11. **Saxifraga californica** Greene, Pittonia **1**: 286. 1889.

Type locality: "Central parts of California in the Coast Range especially."

Range: Washington to California.

Specimens examined: Cascade Mountains to Fort Colville, latitude 49°, *Lyall;* Fort Vancouver, *Scouler.*

These two specimens are thus referred with much hesitancy.

12. **Saxifraga plantaginea** Small, Bull. Torr. Club **23**: 366. 1896.

Type locality: Spokane, Washington. Collected by Sandberg & Leiberg.

Range: Known only from the type locality.

Specimens examined: Spokane, *Sandberg & Leiberg,* May, 1893.

Zonal distribution: Arid Transition.

13. **Saxifraga columbiana** Piper, Bull. Torr. Club **27**: 393. 1900.

Type locality: Pullman, Washington.

Range: British Columbia to Oregon and Idaho.

Specimens examined: Fort Colville, *Lyall* in 1861; Spokane, *Henderson,* May 31, 1892; Hangman Creek, *Sandberg & Leiberg* 16; Pullman, *Piper* 1496, 1808; *Elmer* 126; Almota, *Piper,* May 27, 1893.

Zonal distribution: Arid Transition.

The Sandberg & Leiberg collection was referred by Small[a] to *S. nidifica* Greene.

14. **Saxifraga oregana** Howell, Erythea **3**: 34. 1895.

Type locality: "Mountain marshes of Oregon and Washington."

Range: Washington, Oregon, and Idaho.

Specimens examined: Olympia, *Kincaid,* July 2, 1896; *Henderson* 2488; Tacoma, *Flett* 181; Falcon Valley, *Suksdorf* 1729; Steilacoom, *Piper,* May, 1888.

Zonal distribution: Humid Transition.

15. **Saxifraga integrifolia** Hook. Fl. Bor. Am. **1**: 249. 1833.

Type locality: "Near the mouth of the Columbia." Collected by Scouler.

Range: British Columbia to California west of the Cascade Mountains.

Specimens examined: Puget Sound, *Wilkes Expedition*; Roy, *Allen* 87; Tacoma, *Flett* 22, 60.

Zonal distribution: Humid Transition.

16. **Saxifraga fragosa** Suksdorf, Bull. Torr. Club **23**: 363. 1896.

Saxifraga claytoniaefolia Canby, Bull. Torr. Club **23**: 365. 1896.

Type locality: "Wet rocks near the Columbia River, W. Klickitat County, Washington." Collected by Suksdorf.

Specimens examined: Klickitat County, *Suksdorf* 1727; Falcon Valley, *Suksdorf* 1728, 2201; Klickitat River, *Flett* 1305a, 1309, 1311; Ellensburg, *Whited* 319; Wenache Mountains, *Whited* 1040; Lake River, Clarke County, *Suksdorf* 2496, 2497; without locality, *Vasey* in 1889; Almota, *Piper* 1797, 2793; *Elmer* 139; Wenache Mountains, *Cotton* 1179, 1311.

Zonal distribution: Arid Transition.

Columbia with thinner, nearly glabrous leaves, thus approaching *S. californica* closely, as well as the alpine plant with thick leaves red-tomentose beneath.

The character relied upon to separate *M. allenii* and *M. occidentalis* does not seem valid. At least a duplicate type specimen in the National Herbarium has most of its petals entire at apex. It is very questionable, too, if the character upon which *M. aequidentata* is based will suffice to distinguish it from *M. allenii*. Differences in the compactness of the cyme are subject to the degree of maturity of the specimens and to the effects of altitude and exposure.

[a] Bull. Torr. Club **23**: 366. 1896.

17. **Saxifraga apetala** Piper, Bull. Torr. Club **27**: 393. 1900.

TYPE LOCALITY: Eastern Washington. Collected by Vasey.

RANGE: Wenache Mountains.

SPECIMENS EXAMINED: Kittitas Mountains, *Whited*, May 6, 1896; north branch of Columbia, *Wilkes Expedition* 1070; without locality, *Vasey* in 1889; Wenache Mountains, *Cotton* 1204.

SAXIFRAGA PUNCTATA ACUTIDENTATA Engler, Verh. Zool. Bot. Ges. Vienna **19**: 548. 1869. Type locality: "South Clear Creek, Cascade Mts." Collected by Lyall. Leaves deeply dentate, not cordate; petioles dilated above. It is quite probable that there is an error as to the above locality, as the Gray Herbarium specimen is labelled "Rocky Mts., Lat. 49°" The plant has not been found in the Cascade Mountains by any recent collector.

TIARELLA.

Leaves merely lobed.......... 1. *T. unifoliata.*
Leaves trifoliolate.
    Leaflets coarsely dentate.......... 2. *T. trifoliata.*
    Leaflets deeply lobed or cleft.......... 3. *T. laciniata.*

1. **Tiarella unifoliata** Hook. Fl. Bor. Am. **1**: 238. *pl. 81.* 1833.

Petalosteira unifoliata Raf. Fl. Tell. **2**: 74. 1836.

TYPE LOCALITY: "Height of land in the Rocky Mts. near the source of the Columbia, and at Portage River." Collected by Drummond.

RANGE: Alaska to Northern California, eastward to west Montana.

SPECIMENS EXAMINED: Mount Rainier, *Piper* 2031; along Nisqually River, *Allen* 188; Silverton, *Bouck* 70; Stampede Pass, *Henderson*, July, 1892; Yakima Pass, *Watson* 134; Mount Adams, *Suksdorf* 120, 121; Stevens Pass, *Whited* 1452; Fish Lake, *Dunn*, August 8, 1900; Nason Creek, *Sandberg & Leiberg* 673; Horseshoe Basin, *Lake & Hull* 466; *Elmer* 724; Blue Mountains, *Piper*, July, 1896; without locality, *Vasey* in 1889; Mount Carlton, *Kreager* 186; Usk, *Kreager* 371.

ZONAL DISTRIBUTION: Canadian.

2. **Tiarella trifoliata** L. Sp. Pl. **1**: 406. 1753.

Tiarella stenopetala Presl, Rel. Haenk. **2**: 55. 1835.

Blondia trifoliata Raf. Fl. Tell. **2**: 75. 1836.

TYPE LOCALITY: "Habitat in Asia boreali."

RANGE: Oregon to Alaska and northeast Asia.

SPECIMENS EXAMINED: Clallam County, *Elmer* 2775; Sumas Prairie, *Lyall* in 1859; Seattle, *Smith* 86; Snoqualmie, *Parker*, August, 1892; Steilacoom, *Cooper* in 1854; Skokomish Valley, *Kincaid*, June, 1892; upper Nisqually Valley, *Allen* 8; Roy, *Allen* 104; Mount Adams, *Suksdorf* 121; Cascade Mountains, *Lyall* in 1859; Silverton, *Bouck* 5a, 71; Stevens Pass, *Sandberg & Leiberg*, August, 1893.

ZONAL DISTRIBUTION: Humid Transition.

3. **Tiarella laciniata** Hook. Fl. Bor. Am. **1**: 239. *pl.* 77. 1833.

Petalosteira laciniata Raf. Fl. Tell. **2**: 74. 1836.

Tiarella trifoliata laciniata Wheelock, Bull. Torr. Club **23**: 72. 1896.

TYPE LOCALITY: "North-West coast of America." Collected by Menzies.

RANGE: British Columbia and Washington.

SPECIMENS EXAMINED: Lower Cascades, Skamania County, *Suksdorf* 856 in part; Mount Constitution, *Flett* 2735.

TELLIMA.

Petals sessile, pinnately parted.......... 1. *T. grandiflora*
Petals clawed, palmately cleft.
    Calyx obconic; petals 3-cleft.......... 2. *T. parviflora.*
    Calyx campanulate; petals 3 to 7-cleft.......... 3. *T. tenella.*

1. **Tellima grandiflora** (Pursh) Dougl. Bot. Reg. **14:** *pl. 1178.* 1828.
Mitella grandiflora Pursh, Fl. **1:** 314. 1814.
Tiarella alternifolia Fisch.; Ser. in DC. Prod. **4:** 50. 1830.

Type locality: "On the northwest coast." Collected by Menzies.

Range: Alaska to Southern California, west of the Cascades and Sierras.

Specimens examined: Montesano, *Heller* 3862; Clallam County, *Elmer* 2045; Cascade Mountains, latitude 49°, *Lyall* in 1859; Seattle, *Smith* 88; Tacoma, *Flett* 61; upper Nisqually Valley, *Allen* 7; Silverton, *Bouck* 73; Roy, *Allen* 102, May 19, 1889; Klickitat County, *Suksdorf* 12; Horseshoe Basin, *Lake & Hull* 467; *Elmer* 743; Cape Horn, *Piper* 4973.

Zonal distribution: Humid Transition.

2. **Tellima parviflora** Hook. Fl. Bor. Am. **1:** 239. *pl. 78.* 1833.
Lithophragma parviflora Nutt.; Torr. & Gr. Fl. **1:** 584. 1840.
Mitella parviflora Dietr. Syn. **2:** 539. 1840.

Type locality: "North California" *Menzies.*

Range: British Columbia to California, eastward to Colorado.

Specimens examined: Olympic Mountains, *Grant* in 1889; Orcas Island, *Lyall* in 1858; Admiralty Head, *Piper*, April, 1898; Wenache, *Whited* 1017; West Seattle, *Piper* 89; Rattlesnake Mountains, *Cotton*, 333; White Salmon, *Suksdorf* 273; Spokane, *Henderson*, May, 1892; Hangman Creek, *Sandberg & Leiberg* 32; Fort Colville, *Lyall* in 1861; Spokane County, *Mrs. Tucker*; Pullman, *Elmer* 171; *Piper*, May, 1893; *Hull*, May, 1892; Walla Walla, *Leckenby*, April, 1898.

Zonal distribution: Arid Transition.

3. **Tellima tenella** (Nutt.) Walp. Repert. **2:** 371. 1843.
Lithophragma tenella Nutt.; Torr. & Gr. Fl. **1:** 584. 1840.

Type locality: "In the central range of the Rocky Mountains, on the banks of the Big Sandy and Siskadee rivers of the Colorado of the West, about lat. 42°." Collected by Nuttall.

Range: British Columbia to Wyoming, southward to south California and New Mexico.

Specimens examined: Wenache Region, *Brandegee* 761. Wenache, *Whited* 1017; Ellensburg, *Whited* 261; Falcon Valley, *Suksdorf* 272½; White Salmon, *Suksdorf* 272; Klickitat River, *Flett* 1307; Pullman, *Elmer* 80; Wawawai, *Piper*, May, 1893; Clarkston, *Hunter* 2.

Zonal distribution: Arid Transition.

Rydberg[a] regards our plant as a distinct species under the name *Lithophragma bulbifera*, stating that it differs from its immediate allies in being bulbiferous in the leaf axils and in having fimbriate instead of entire sepals.

Tellima glabra Steud.[b] (*Lithophragma glabra* Nutt.[c]), found by Nuttall in the Blue Mountains of Oregon, is said by Rydberg[d] to differ from *T. tenella*, which is known only from the Rocky Mountains, in having muriculate seeds and pedicels larger than the capsules.

CHRYSOSPLENIUM.

1. **Chrysosplenium scouleri** (Hook.) Rose, Bot. Gaz. **23:** 277. 1897.
Chrysosplenium oppositifolium scouleri Hook. Fl. Bor. Am. **1:** 242. 1834.
Chrysosplenium glechomaefolium Nutt.; Torr. & Gr. Fl. **1:** 589. 1840.

Type locality: "Columbia River on the North West coast." Collected by Scouler.

Range: British Columbia to Oregon in the coast region.

Specimens examined: Hoquiam, *Lamb* 1044; upper Nisqually Valley, *Allen* 150; Nisqually River, *Flett* 92; Mashel Mountain, *Piper* 2029, 748; Columbia River, *Nuttall*; without locality, *Cooper*; Ilwaco, *Piper* 4992; Quinault, *Conard* 131.

Zonal distribution: Humid Transition and Canadian.

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[a] N. Am. Fl. **22^2:** 86. 1906.

[b] Nom. ed. 2. **2:** 665. 1841.

[c] Torr. & Gr. Fl. **1:** 584. 1840.

[d] N. Am. Fl. **22^2:** 84, 85. 1906.

MITELLA.

Stamens opposite the pinnatifid green petals .... 1. *M. pentandra.*
Stamens alternating with the petals.
  Calyx green; petals pinnatifid.
    Stems bearing 1 to 3 leaves; stoloniferous.................. 2. *M. caulescens.*
    Stems leafless; not stoloniferous.
      Leaves broadly reniform-cordate....................... 3. *M. breweri.*
      Leaves ovate.. 4. *M. ovalis.*
  Calyx white; petals trifid or entire.
    Petals entire; calyx-lobes obtuse........................... 5. *M. micrantha.*
    Petals 3-cleft or 3-parted.
      Raceme secund; petals 3-parted with filiform divaricate lobes .... 6. *M. stauropetala.*
      Raceme not secund; petals cuneate, 3-cleft at apex, the lobes not divaricate.
        Calyx-lobes obtuse; leaf lobes rounded............ 7. *M. trifida.*
        Calyx-lobes acute; leaves angularly lobed.......... 8. *M. diversifolia.*

1. **Mitella pentandra** Hook. Bot. Mag. **56**: *pl. 2933*. 1829.

Drummondia mitelloides DC. Prod. **4**: 50. 1830.

Mitellopsis drummondii Meisn. Pl. Vasc. Gen. **1**: 100. 1836.

TYPE LOCALITY: "Rocky Mountains of North America." Type specimen raised from seed collected by Drummond.

RANGE: British Columbia to Saskatchewan, Colorado, and Oregon.

SPECIMENS EXAMINED: Olympic Mountains, *Piper*, August, 1895; *Henderson*, July 11, 1892; Mount Rainier, *Piper* 2028; upper Nisqually Valley, *Allen* 5; Mount Stuart, *Sandberg & Leiberg*, June, 1893, 567; Stevens Pass, *Piper*, July, 1895; Wenache Mountains, *Elmer* 165; Skokomish Valley, *Kincaid*, June, 1892; Cascade Mountains, *Henderson*, August, 1892; Horseshoe Basin, *Lake & Hull*, August, 1892; Blue Mountains, *Horner* 122; *Piper* 2410.

ZONAL DISTRIBUTION: Hudsonian.

Rydberg considers that two species have been confused under *M. pentandra*, designating them as *Pectiantia pentandra* and *P. latiflora* Rydberg.[a] The somewhat larger flowers and hairy petioles of the latter are considered diagnostic, but we find all intermediates in the size of the flowers and also find hairy petioles on small-flowered plants. Both extremes as to the size of the flowers occur in the Cascade Mountains.

2. **Mitella caulescens** Nutt.; Torr. & Gr. Fl. **1**: 586. 1840.

Mitellastra caulescens Howell, Fl. N. W. Am. 201. 1898.

TYPE LOCALITY: "Shady woods of the Oregon near the mouth of the Wahlamet." Collected by Nuttall.

RANGE: British Columbia to Oregon and north Idaho.

SPECIMENS EXAMINED: Seattle, *Piper* 90; Skokomish Valley, *Kincaid*, May, 1892; upper Nisqually Valley, *Allen* 9; Falcon Valley, *Suksdorf* 365; woods of the Columbia, *Nuttall;* lower Frazer River, latitude 49°, *Lyall* in 1859; Mount Carlton, *Kreager* 203.

ZONAL DISTRIBUTION: Humid Transition.

3. **Mitella breweri** A. Gray, Proc. Am. Acad. **6**: 533. 1865.

TYPE LOCALITY: "Mount Hoffman, in a damp place at about 11,000 feet altitude", California. Collected by Brewer.

RANGE: California to British Columbia and north Idaho.

SPECIMENS EXAMINED: Baldy Peak, *Lamb* 1347; Mount Rainier, *Piper* 2030; *Allen* 48; *Flett* 303; Goat Mountains, *Allen* 86; Mount Adams, *Henderson*, August, 1892; *Suksdorf* 364; Nason Creek, *Sandberg & Leiberg* 661.

ZONAL DISTRIBUTION: Hudsonian.

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[a] N. Am. Fl. **22**^{2}: 86. 1906.

4. **Mitella ovalis** Greene, Pittonia **1**: 32. 1887.
Mitella hallii Howell, Erythea **3**: 33. 1895.
Type locality: Mendocino County, California.
Range: Washington to north California near the coast.
Specimens examined: Hoquiam, *Lamb* 1056; Quinault, *Conard* 225.

5. **Mitella micrantha** Piper, Erythea **7**: 162. 1899.
Type locality: Fort Colville, Washington. Collected by Watson.
Range: Known only by the type specimen.
Specimens examined: Fort Colville, *Watson* 135.

6. **Mitella stauropetala** Piper, Erythea **7**: 161. 1899.
Type locality: Craig Mountains, Nez Perce County, Idaho.
Range: Idaho.
Common near the Washington line and to be expected on Kamiak Butte and in the Blue Mountains.

7. **Mitella trifida** Graham, Edinb. New Phil. Journ. **7**: 185. 1829.
Mitellopsis hookeri Meisn. Pl. Vasc. Gen. **1**: 100. 1836.
Type locality: Type raised from seeds presented by Mr. Drummond "after the return of the last overland journey to the arctic coast of America."
Range: Washington to Saskatchewan.
Specimens examined: Olympic Mountains, *Flett* 83; Mount Rainier, *Allen* 7; Goat Mountains, *Allen* 195; Mount Stuart, *Sandberg & Leiberg* 815; Mount Baker, *Flett* 858; west Klickitat County, *Suksdorf* 122; Wenache Mountains, *Cotton* 1281.

Rydberg [a] separates the Cascade and Olympic Mountain plant from that of the Rocky Mountains as *Ozomelis pacifica*. The distinction relied upon is the slightly larger size of the calyx and corolla.

8. **Mitella diversifolia** Greene, Pittonia **1**: 32. 1887.
Mitella diversiloba Greene; Piper, Erythea **7**: 162. 1899, err. typ.
Type locality: "From the same region as the preceding," i. e. "summit of Trinity Mountains, California." Collected by C. C. Marshall.
Range: North California to Washington.
Specimens examined: White Salmon River, *Suksdorf* 13.

HEUCHERA.

- Stamens exserted; flowers in loose panicles.
  - Leaf lobes triangular, acute; herbage glabrous............ 1. ***H. glabra.***
  - Leaf lobes rounded; herbage pubescent, at least the under leaf surface.. 2. ***H. micrantha.***
- Stamens included.
  - Flowers in a loose raceme............................... 3. ***H. racemosa.***
  - Flowers in a spike or spike-like panicle.
    - Calyx white; leaves subcoriaceous, glabrous.
      - Stems and petioles glabrous.................. 4. ***H. glabella.***
      - Stems and petioles villous..................... 4a. ***H. glabella columbiana.***
    - Calyx green, leaves not subcoriaceous.
      - Leaves thin, glabrous........................ 7. ***H. tenuifolia.***
      - Leaves thickish, not glabrous.
        - Pubescence villous or hirsute............. 5. ***H. cylindrica.***
        - Pubescence glandular.
          - Spike 2 to 4 cm. long............... 6. ***H. ovalifolia.***
          - Spike less than 2 cm. long........... 6a. ***H. ovalifolia alpina.***

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[a] N. Am. Fl. 22^{2}: 95. 1906.

1. **Heuchera glabra** Willd.; Roem. & Schult. Syst. **6**: 216. 1820.

Heuchera divaricata Fisch.; Ser. in DC. Prod. **4**: 51. 1830.

Tiarella colorans Graham, Edinb. New Phil. Journ. **7**: 349. 1829.

TYPE LOCALITY: Western North America.

RANGE: Alaska to Oregon.

SPECIMENS EXAMINED: Snoqualmie, *Parker*, August, 1892; Mount Rainier, *Smith*, August, 1890; *Piper* 2027, 548; Goat Mountains, *Allen* 194; Baldy Peak, *Lamb* 1377; Mount Adams, *Suksdorf* 546; Skamania County, *Suksdorf* 968; Peshastin, *Sandberg & Leiberg* 485; Bridge Creek, *Elmer* 674.

ZONAL DISTRIBUTION: Hudsonian.

2. **Heuchera micrantha** Dougl.; Lindl. Bot. Reg. **15**: *pl. 1302.* 1829.

Heuchera barbarossa Presl, Rel. Haenk. **2**: 56. 1835.

TYPE LOCALITY: "Mountainous woods, near the Grand Rapids [Cascades] of the Columbia." Collected by Douglas.

RANGE: British Columbia to north Idaho and California. Mexico.

SPECIMENS EXAMINED: Clallam County, *Elmer* 2651; Snoqualmie, *Parker*, August, 1892; Skokomish Valley, *Kincaid*, May, 1892; upper Nisqually Valley, *Allen* 10; Silverton, *Bouck* 71a; Peshastin, *Sandberg & Leiberg* 485; Columbia River, *Barclay;* west Klickitat County, *Suksdorf*, June, 1874; Union City, *Piper* in 1890.

ZONAL DISTRIBUTION: Humid Transition and Canadian.

Two forms occur, one with the petioles very villous, the other having them nearly glabrous. The former seems to be the typical *H. micrantha* Dougl., but Rydberg[a] has recently considered it a distinct species, naming it *H. nuttallii*.

3. **Heuchera racemosa** S. Wats. Proc. Am. Acad. **20**: 365. 1885.

Tellima racemosa Greene, Erythea **3**: 55. 1896.

TYPE LOCALITY: "On cliffs of Mt. Adams, Wash., at 7–8000 ft. altitude." Collected by Suksdorf.

RANGE: Washington.

SPECIMENS EXAMINED: Olympic Mountains, *Piper* 2215, 913; Clallam County, *Elmer* 2641; Mount Rainier, *Piper* 2032; *Allen* 196; Mount Adams, *Suksdorf*, July, 1883; *Henderson* 2490; mountains north of Ellensburg, *Brandegee* 765; Nason Creek, *Sandberg & Leiberg* 662; Bridge Creek, *Elmer* 689.

ZONAL DISTRIBUTION: Arctic.

This species forms the type of the genus Elmera proposed by Rydberg.[b]

4. **Heuchera glabella** Torr. & Gr. Fl. **1**: 581. 1840.

Heuchera cylindrica glabella Wheelock, Bull. Torr. Club **17**: 203. 1890.

TYPE LOCALITY: "Rocky Mountains towards Oregon." Collected by Nuttall.

RANGE: Eastern Oregon to Montana and northward into British Columbia.

SPECIMENS EXAMINED: Sprague, *Henderson*, May, 1892; Spokane County, *Suksdorf* 299; Blue Mountains, *Piper*, July, 1896; Pullman, *Piper* 1497; without locality, *Vasey* in 1889; Clarks Springs, *Kreager* 71; Chelan Butte, *Cotton* 183.

ZONAL DISTRIBUTION: Arid Transition.

4a. **Heuchera glabella columbiana** (Rydberg).

Heuchera columbiana Rydberg, N. Am. Fl. **22**²: 116. 1905.

TYPE LOCALITY: "Near Swan Lake, Washington." Swan Lake is erroneous, the locality being Loon Lake, Stevens County.

Differs from *H. glabella* principally in the hirsute stems and petioles.

SPECIMENS EXAMINED: Clarks Springs, *Beattie & Chapman* 2019; Loon Lake, *Winston*, July 20, 1897; Ellensburg, *Elmer* 419; Wenache Mountains, *Whited* 1134.

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[a] N. Am. Fl. **22**²: 103. 1906.

[b] N. Am. Fl. **22**²: 116. 1906.

5. **Heuchera cylindrica** Dougl.; Hook. Fl. Bor. Am. 1: 236. 1833.

TYPE LOCALITY: "On the declivities of low hills, and on the steep banks of streams on the west side of the Rocky Mountains." Collected by Douglas.

RANGE: British Columbia to southern Oregon and east to north Idaho.

SPECIMENS EXAMINED: Montesano, *Heller* 4067; Sumas Prairie, *Lyall* in 1858; Orchard Point, *Piper*, July, 1895; Tacoma, *Flett* 123; Falcon Valley, *Suksdorf* 1739; Vancouver, *Piper* 4944.

ZONAL DISTRIBUTION: Humid Transition.

6. **Heuchera ovalifolia** Nutt.; Torr. & Gr. Fl. 1: 581. 1840.

TYPE LOCALITY: "Blue Mountains, Oregon, on rocks." Collected by Nuttall.

RANGE: British Columbia to Wyoming and Oregon.

SPECIMENS EXAMINED: Mount Stuart, *Elmer*, August, 1898?; Wenache Mountains, *Whited* 3; Leavenworth, *Savage* 26; Cascade Mountains, Yakima County, *Henderson* 2492; between Coulee City and Waterville, *Spillman*, May 27, 1896; north fork of Columbia River, *Wilkes Expedition*.

6a. **Heuchera ovalifolia alpina** (S. Wats.)

Heuchera cylindrica alpina S. Wats. Bot. King Explor. 96. 1871.

TYPE LOCALITY: "Clover Mountains, Nevada; 11000 feet altitude."

RANGE: British Columbia to Nevada.

SPECIMENS EXAMINED: Mount Adams, *Henderson* 2491; *Suksdorf* 14; Wenache Mountains, *Elmer*, July, 1897.

This seems to be merely a reduced alpine state of *H. ovalifolia* Nutt.

ZONAL DISTRIBUTION: Arctic.

7. **Heuchera tenuifolia** (Wheelock) Rydberg, N. Am. Fl. 22^2:116. 1905.

Heuchera cylindrica tenuifolia Wheelock, Bull. Torr. Club 17: 204. 1890.

TYPE LOCALITY: Near the Dalles, Oregon. Collected by Howell.

RANGE: Oregon and Washington.

SPECIMENS EXAMINED: Simcoe Mountains, *J. Howell*, June, 1879; Major Creek, Klickitat County, *Suksdorf* 857.

HEUCHERA SUKSDORFII Rydberg, N. Am. Fl. 22^2: 116. 1906. Type locality: Falcon Valley. Collected by Suksdorf. This is closely related to *H. ovalifolia* Nutt., but is said to differ in having the leaves deeply lobed and the teeth broadly ovate.

LEPTAXIS.

1. **Leptaxis menziesii** (Pursh) Raf. Fl. Tell. 2: 75. 1836.

Tiarella menziesii Pursh, Fl. 1: 313. 1814.

Heuchera menziesii Hook. Fl. Bor. Am. 1: 237. *pl. 80.* 1833.

Tolmiea menziesii Torr. & Gr. Fl. 1: 582. 1840.

TYPE LOCALITY: "On the northwest coast." Collected by Menzies.

RANGE: Alaska to Mendocino County, California, west of the Cascade Mountains.

SPECIMENS EXAMINED: Montesano, *Heller* 3851; Clallam County, *Elmer* 2776; Hoquiam, *Lamb* 1054; Seattle, *Piper* 92; Skokomish Valley, *Kincaid*, May, 1892; upper Nisqually Valley, *Allen* 6, Silverton, *Bouck* 71; Cascade Mountains, latitude 49°, *Lyall* in 1859; Port Ludlow, *Binns;* Roy, *Allen* 78.

ZONAL DISTRIBUTION: Humid Transition and Canadian.

PARNASSIA.

1. **Parnassia fimbriata** König, Ann. Bot. 1: 391. 1805.

TYPE LOCALITY: "On the coast of northwest America." Collected by Menzies.

RANGE: Alaska to Oregon and Colorado.

Specimens examined: Olympic Mountains 2208; Mount Rainier, *Piper* 2037; *Allen* 282; Cascade Mountains, latitude 49°, *Lyall* in 1859; Stevens Pass, *Whited* 1430; Fish Lake, *Dunn*, August 8, 1900; Bridge Creek, *Elmer* 673.

Zonal distribution: Hudsonian.

GROSSULARIACEAE. Currant Family.

RIBES. Currant. Gooseberry.

Stems usually armed with spines and frequently with prickles; leaves plicate in the bud.
  Peduncles 1 to 4-flowered; calyx tube campanulate or cylindric.
    Flowers about 2 cm. long, dark purple; berries warty, glandular.. 1. *R. lobbii.*
    Flowers much smaller, greenish or purple or white.
      Berries prickly.................................. 2. *R. watsonianum.*
      Berries smooth.
        Calyx lobes longer than the tube; stamens decidedly longer than the whole calyx.
          Flowers white; calyx lobes narrow.......... 3. *R. niveum.*
          Flowers greenish or purplish; calyx lobes broader.................................. 4. *R. divaricatum.*
        Calyx lobes equaling or shorter than the tube.
          Stamens scarcely longer than the whole calyx; flowers greenish; prickles often wanting... 5. *R. inerme.*
          Stamens decidedly shorter than the whole calyx.
            Lobes equaling the campanulate tube... 6. *R. irriguum.*
            Lobes shorter than the cylindric tube... 7. *R. cognatum.*
  Peduncles nodding; flowers rather numerous in a raceme; calyx tube saucer-shaped; berries glandular.
    Leaves glabrous or nearly so; berries black.............. 8. *R. lacustre.*
    Leaves pubescent or glandular; berries red................ 9. *R. lentum.*
Stems not thorny or prickly.
  Leaves convolute in the bud; flowers yellow; calyx-tube long cylindric.. 18. *R. aureum.*
  Leaves plicate in the bud; flowers green, white or red.
    Calyx tube rotate.
      Berries red, smooth.................................. 14. *R. ciliosum.*
      Berries black, glandular.
        Flowers white.................................. 13. *R. petiolare.*
        Flowers greenish.
          Racemes erect or ascending.
            Glands sessile.......................... 10. *R. bracteosum.*
            Glands stalked.......................... 11. *R. laxiflorum.*
          Racemes pendent.......................... 12. *R. howellii.*
    Calyx tube cylindric or campanulate.
      Flowers red; raceme drooping, many-flowered........ 15. *R. sanguineum.*
      Flowers white or greenish; inflorescence few-flowered.
        Berries red or orange, glabrous or slightly glandular; leaves resinous-dotted; raceme drooping... 16. *R. cereum.*
        Berries black, glandular; leaves viscid-pubescent; inflorescence corymbose...................... 17. *R. viscosissimum.*

1. Ribes lobbii A. Gray, Am. Nat. **10**: 274. 1876.

Type locality: "Vancouver Island." Collected by Wood.

Range: Vancouver Island to North California west of the Cascade Mountains.

SPECIMENS EXAMINED: Clallam County, *Elmer* 2655; Puget Sound, *Brandegee* in 1885; upper Nisqually Valley, *Allen* 28; west Klickitat County, *Suksdorf* 17.

ZONAL DISTRIBUTION: Humid Transition.

2. **Ribes watsonianum** Koehne, Deutsche Dendr. 197. 1893.

Ribes ambiguum S. Wats. Proc. Am. Acad. **18**: 193. 1883, not Maxim. 1874.

TYPE LOCALITY: "Im Washingtongebiet."

RANGE: Cascade Mountains, Washington.

SPECIMENS EXAMINED: Mount Adams, *Suksdorf* 18, 337, 54; Wenache region, *Brandegee* 770; without locality, *Vasey* in 1889.

3. **Ribes niveum** Lindl. Bot. Reg. **20**: *pl. 1692.* 1835.

Ribes triflorum Willd. err. det. Hook. Fl. Bor. Am. **1**: 230. 1831.

TYPE LOCALITY: "North-west America." Collected by Douglas.

RANGE: Idaho and adjacent Washington to Nevada.

SPECIMENS EXAMINED: Almota, *Piper* 1887; Wawawai, *Elmer* 90.

ZONAL DISTRIBUTION: Upper Sonoran.

4. **Ribes divaricatum** Dougl. Trans. Hort. Soc. Lond. **7**: 515. 1830.

TYPE LOCALITY: "Northwest coast of North America from the 45° to the 52° N. Lat." Collected by Douglas.

RANGE: British Columbia to southern California west of the Cascade Mountains.

SPECIMENS EXAMINED: Montesano, *Heller* 3921; Hoquiam, *Lamb* 1005; Admiralty Head, *Piper*, April, 1898; Seattle, *Piper* in 1897; Orchard Point, *Piper*, July, 1895; Port Ludlow, *Binns*; Puget Sound, *Brandegee* in 1885; Seattle, *Engelman & Sargent* in 1880; upper Nisqually Valley, *Allen* 69; Ellensburg, *Piper*, May, 1897; Rock Island, *Henderson*, July, 1892.

ZONAL DISTRIBUTION: Humid Transition.

5. **Ribes inerme** Rydberg, Mem. N. Y. Bot. Gard. **1**: 202. 1900.

TYPE LOCALITY: "Slough Creek," Montana.

RANGE: Rocky Mountains from Montana to New Mexico and westward to the Sierras and Cascades.

SPECIMENS EXAMINED: Near Ellensburg, *Piper*, May, 1897; *Whited* 288; Pullman, *Piper* 1801, 3538; *Elmer* 87, 1256; without locality, *Vasey* in 1889; Chewaukum, *Whited* 2545.

ZONAL DISTRIBUTION: Arid Transition.

6. **Ribes irriguum** Dougl. Trans. Lond. Hort. Soc. **7**: 576. 1830.

Ribes leucoderme Heller, Bull. Torr. Club **24**: 93. 1897.

TYPE LOCALITY: "On the Blue Mts. in latitude 46° 33′, very common;" "also on hills on the banks of the Spokane River." Collected by Douglas.

RANGE: North Idaho and adjacent Washington.

SPECIMENS EXAMINED: Spokane, *Sandberg & Leiberg*, May, 1893; *Piper* 2262, 2284; Spokane Valley, *Lyall* in 1861; Blue Mountains, *Piper* 2433; along Tukanon River, *Lake & Hull* 459; Mount Carlton, *Kreager* 215.

ZONAL DISTRIBUTION: Arid Transition.

7. **Ribes cognatum** Greene, Pittonia **3**: 115. 1896.

TYPE LOCALITY: "River banks at Pendleton," Oregon. Collected by Howell.

RANGE: Eastern Washington and eastern Oregon.

SPECIMENS EXAMINED: Wenache region, *Brandegee* 772; Sprague, *Sandberg & Leiberg* 150; Walla Walla, *Mrs. Anderson;* Union Flat Creek, *Piper* 1810, 2628, 3565, 3566; *Elmer* 116; Almota, *Piper* 2627; Wawawai, *Piper* 1501.

ZONAL DISTRIBUTION: Arid Transition.

8. **Ribes lacustre** (Pers.) Poir. Encyc. Suppl. **2**: 856. 1811.

Ribes echinatum Dougl. Trans. Hort. Soc. Lond. **7**: 517. 1830.

TYPE LOCALITY: Lake Mistassini, Canada.

RANGE: Labrador and New England to Alaska, and south to central California.

SPECIMENS EXAMINED: Olympic Mountains, *Henderson* 321; *Elmer* 2656; Admiralty Head, *Piper*, April, 1898; Port Ludlow, *Binns;* upper Nisqually Valley, *Allen* 29; near Skagit Pass, *Lake & Hull*, August, 1892; Mount Adams, *Suksdorf* 19; Mount Stuart, *Elmer* 1257; Wenache Mountains, *Whited* 1243; Wenache region, *Brandegee* 771; Lake Wenache, *Sandberg & Leiberg* 645; Blue Mountains, *Piper* 2423, August, 1896; *Lake & Hull*, July, 1892.

ZONAL DISTRIBUTION: Transition and Canadian.

9. **Ribes lentum** (Jones) Coville & Rose, Proc. Biol. Soc Wash. **15**: 28. 1902.

Ribes lacustre molle A. Gray, Bot. Cal. 1: 206. 1880.

Ribes lacustre lentum Jones, Proc. Cal. Acad. II. **5**: 681. 1895.

Ribes molle Howell, Fl. N. W. Am. 1: 209. 1898, not Poepp. 1858.

Ribes nubigenum McClatchie, Erythea **2**: 80. 1894, not Phil. 1856.

Ribes montigenum McClatchie, Erythea **5**: 38. 1897.

TYPE LOCALITY: Utah.

RANGE: Washington to California and Utah.

SPECIMENS EXAMINED: Mount Adams, *Henderson* 2489; Klickitat River, *Flett* 1318.

10. **Ribes bracteosum** Dougl.; Hook. Fl. Bor. Am. 1: 233. 1831. STINK CURRANT.

TYPE LOCALITY: "At the confluence of the Columbia with the ocean." Collected by Scouler and by Douglas.

RANGE: Alaska to north California, west of the Cascade Mountains.

SPECIMENS EXAMINED: Hoquiam, *Lamb* 1011; Montesano, *Heller* 3912; Seattle, *Piper* 96; Silverton, *Bouck* 65; Clallam County, *Elmer* 2652; Cascade Mountains. *Suksdorf* 124; Mount Adams, *Suksdorf* 124; Nisqually valley, *Allen* 27; Stevens Pass, *Sandberg & Leiberg* 728; Horseshoe Basin, *Elmer* 861; without locality, *Cooper;* without locality, *Vasey* in 1889.

ZONAL DISTRIBUTION: Humid Transition to Hudsonian.

11. **Ribes laxiflorum** Pursh, Fl. **2**: 731. 1814.

Ribes affine Dougl.; Bong. Mem. Acad. St. Petersb. VI. **2**: 138. 1832.

TYPE LOCALITY: "On the northwest coast." Collected by Menzies.

RANGE: Alaska to Oregon, near the coast.

SPECIMENS EXAMINED: Head of Duckaboose River, Olympic Mountains, *Piper* 2206; Chehalis County, *Lamb* 1064a; head of Twisp River, *Whited* 221; without locality, *Cooper;* Ilwaco, *Piper* 4954.

ZONAL DISTRIBUTION: Canadian.

12. **Ribes howellii** Greene, Erythea **4**: 57. 1896.

Ribes acerifolium Howell, Erythea **3**: 34. 1895, not Koch. 1869.

Ribes laxiflorum Pursh, err. det. Howell, Fl. N. W. Am. 1: 208. 1898.

TYPE LOCALITY: On Mount Hood, Oregon.

RANGE: Mount Hood, Oregon, northward into British Columbia in the mountains.

SPECIMENS EXAMINED: Olympic Mountains, *Piper* 2207; *Elmer* 2657; *Sargent*, August 18, 1896; Mount Rainier, *Piper* 2035, August, 1888; *Sargent*, August 18, 1896; Goat Mountains, *Allen* 70; Klickitat River, *Flett* 1308, 1320; Nason Creek, *Sandberg & Leiberg* 669; Bridge Creek, *Elmer* 666; Mount Adams, *Suksdorf* 634, 367.

ZONAL DISTRIBUTION: Hudsonian.

13. **Ribes petiolare** Dougl. Trans. Hort. Soc. Lond. 7: 514. 1830.

TYPE LOCALITY: "On the western base of the Rocky Mts. from the 48° to the 52° N. Lat." Collected by Douglas.

RANGE: British Columbia to western Montana and northern Utah.

SPECIMENS EXAMINED: Wenache region, *Brandegee* 769; Wenache, *Whited*, May, 1896; near Ellensburg, *Piper* 2626; Simcoe Mountains, *Howell*, June, 1879; Mount Stuart, *Sandberg & Leiberg* 566; Peshastin, *Sandberg & Leiberg*, July, 1893; along Salmon River, *Horner* 296; without locality, *Vasey* in 1889; Wenache Mountains, *Cotton* 1318.

ZONAL DISTRIBUTION: Arid Transition.

This species has been confused with *Ribes hudsonianum* Richards., which is not known west of the Rocky Mountains.

14. **Ribes ciliosum** Howell, Fl. N. W. Am. **1**: 208. 1898.

Ribes migratorium Suksdorf, Deutsche Bot. Monatss. **18**: 86. 1900.

TYPE LOCALITY: "Marshy ground about the base of Mt. Hood on the south side," Oregon. Collected by Howell.

RANGE: Cascade Mountains of Oregon and Washington.

SPECIMENS EXAMINED: Skamania County, *Suksdorf* 969; Klickitat River, *Flett* 1320; without locality, *Vasey* in 1889.

15. **Ribes sanguineum** Pursh, Fl. **1**: 164. 1814. RED FLOWERING CURRANT.

TYPE LOCALITY: "On the Columbia River." Collected by Lewis. The exact locality was near Deer Island.

RANGE: British Columbia to California in the coast region.

SPECIMENS EXAMINED: Clallam County, *Elmer* 2658, 2654; Cascade Mountains, latitude 49°, *Lyall* in 1859; Seattle, *Piper* 97; Lake Washington, *Engelman & Sargent*, July 16, 1880; Admiralty Head, *Piper*, April, 1898; Tacoma, *Flett* 69; upper Nisqually Valley, *Allen* 80; Port Ludlow, *Binns;* Silverton, *Bouck* 66; Columbia River, *Douglas* in 1833; without locality, *Cooper;* Lake Chelan, *Lake & Hull* 462.

ZONAL DISTRIBUTION: Humid Transition.

The color of the flowers of this species varies from very dark to very pale crimson. Occasional specimens are white-flowered.

16. **Ribes cereum** Dougl. Trans. Hort. Soc. Lond. **7**: 512. 1830.

Ribes reniforme Nutt. Journ. Acad. Phila. **7**: 21. 1834.

TYPE LOCALITY: On "the river Columbia from the Great Falls 45° 46′ 17″ N. Lat. to the source of that stream in the Rocky Mts." Collected by Douglas.

RANGE: British Columbia to New Mexico and South Dakota.

SPECIMENS EXAMINED: Ellensburg, *Piper* 2625; Mount Adams *Suksdorf*, September, 1877; Columbia Valley, *Lyall* in 1860; Rock Island, *Sandberg & Leiberg* 442; Rattlesnake Mountains, *Cotton* 324; upper Naches River, *Henderson*, June, 1892; White Bluffs, *Lake & Hull* 461; Rock Lake, *Sandberg & Leiberg*, June, 1893; Rock Creek, *Sandberg & Leiberg* 93; Coulee City, *Henderson*, July, 1892; Spokane, *Sandberg, McDougal & Heller*, April 20, 1892; *Heller* 2936; Pullman, *Piper*, May, 1894; near Almota, *Piper*, April, 1894, June, 1894; without locality, *Vasey* in 1889.

ZONAL DISTRIBUTION: Arid Transition and Upper Sonoran.

17. **Ribes viscosissimum** Pursh, Fl. **1**: 163. 1814.

TYPE LOCALITY: "On the Rocky Mountains in the interior of North America." Collected by Lewis. The exact locality is on the Lolo Trail, Bitterroot Mountains, Idaho.

RANGE: British Columbia to California and Montana.

SPECIMENS EXAMINED: Twisp River, *Whited* 181, and July, 1896; Klickitat River, *Flett* 1306; Conconully, *Whited* 1323; Nason Creek, *Sandberg & Leiberg* 684; Spokane, *Sandberg & Leiberg*, May, 1893; Blue Mountains, *Piper*, July, 1896; *Sargent*, July 3, 1896; without locality, *Brandegee* in 1883; without locality, *Vasey* in 1889; Mount Carlton, *Kreager* 251; Wenache Mountains, *Cotton* 1278.

ZONAL DISTRIBUTION: Arid Transition and Canadian.

18. **Ribes aureum** Pursh, Fl. **1**: 164. 1814. GOLDEN CURRANT.

TYPE LOCALITY: "On the banks of the rivers Missouri and Columbia." Collected by Lewis.

RANGE: Washington to Montana and southward to California.

SPECIMENS EXAMINED: Wenache, *Whited* 22; 1349; Ellensburg, *Piper* in 1897; Naches River, *Henderson* in 1892; Douglas County, *Spillman* in 1896; North Yakima, *Flett* in

1027; Rattlesnake Mountains, *Cotton* 320; Spokane, *Heller* 2935; *Dewart*, May 3, 1901; Spokane Valley, *Lyall* in 1861; Spokane County, *Suksdorf* 301; Hangman Creek, *Sandberg & Leiberg* 21; Clarks Springs, *Kreager* 64; west Klickitat County, *Suksdorf* 20; Union Flat, *Piper* in 1897; Almota, *Piper* 1886; *Lake & Hull* 460.

ZONAL DISTRIBUTION: Upper Sonoran.

The fruit of this plant in Washington is commonly yellow, but near Ellensburg forms with yellow, red, and black fruits occur growing together. Excepting for this character they appear indistinguishable.

HYDRANGEACEAE. HYDRANGEA FAMILY.

Shrub low, spreading or trailing; stamens 10 to 12 or sometimes fewer;
ovule and seed solitary in each carpel.............................. WHIPPLEA.
Shrub erect; stamens many; ovules and seeds numerous in each carpel.. PHILADELPHUS.

WHIPPLEA.

1. **Whipplea modesta** Torr. Pac. R. Rep. **4**: 90. *pl.* 7. 1857.

TYPE LOCALITY: "Redwoods, California."

RANGE: Washington to California.

SPECIMENS EXAMINED: Chehalis County, *Lamb*.

PHILADELPHUS.

Leaves pubescent only on the nerves beneath, entire or denticulate;
styles united for half their length, rarely for more.................. 1. *P. lewisii.*
Leaves pubescent all over beneath, usually dentate; styles united for
two-thirds their length.. 2. *P. gordonianus.*

1. **Philadelphus lewisii** Pursh, Fl. **1**: 329. 1814. SYRINGA.

Philadelphus confusus Piper, Bull. Torr. Club **29**: 225. 1902, as to type.

TYPE LOCALITY: "On the waters of Clark's River." Collected by Lewis, July 4, 1806. On this date Lewis, according to Coues, was on "Hellgate River, between Missoula, Montana, and the mouth of the Big Blackfoot River, Montana."

RANGE: British Columbia to Oregon from the Cascade Mountains eastward to Montana and Utah.

SPECIMENS EXAMINED: Wenache, *Whited* 143; Ellensburg, *Elmer* 380; Yakima region, *Brandegee;* Rock Island, *Sandberg & Leiberg* 452; Cowiche Creek, *Cotton* 465; Grand Coulee, *McKay* 17; Spokane, *Piper*, September 1, 1899; Spangle, *Suksdorf* 300; Blue Mountains, *Piper* in 1896; *Sargent* in 1896; Colfax, *Piper;* Wawawai, *Lake & Hull* 464; *Piper* 3828; Tum Tum Mountain, *Allen* 221; Cape Horn, *Piper* 5030.

ZONAL DISTRIBUTION: Arid Transition.

2. **Philadelphus gordonianus** Lindl. Bot. Reg. **24**: Misc. 21. 1838. SYRINGA.

Philadelphus confusus Piper, Bull. Torr. Club **29**: 225. 1902, as to most specimens cited.

TYPE LOCALITY: "Along the banks of the Columbia." Collected by Douglas.

RANGE: British Columbia to North California in the coast region.

SPECIMENS EXAMINED: Near Satsop, *Heller* 4023; Cascade Mountains, latitude 49°, *Lyall* in 1859; Seattle, *Piper* in 1888; Tacoma, *Flett* 113; Muckleshoot Prairie, *Dr. Ruhn;* Fidalgo Island, *Flett* 2100; Devils Head, *Flett* 2101; without locality, *Vasey* in 1889; without locality, *Cooper*; Seattle, *Sargent & Englemann* in 1880; Crescent Lake, *Sargent* in 1896; Cape Horn, *Piper* 5031.

ZONAL DISTRIBUTION: Humid Transition.

The types of *gordonianus* and *lewisii* are the same as to style character. Relying upon this as a better character than leaf pubescence, I proposed *P. confusus.* Upon further study however, I am convinced that the leaf characters, including pubescence, separate the two species more truly than does the style character.

Rydberg, in his recent treatment of the genus in the North American Flora, recognizes 6 species in this group. The characters relied upon, however, are not at all convincing. *P. confusus* Piper is considered a valid species; *P. columbianus* Koehne[a] supposed to be from British Columbia, is identified with specimens here referred to *P. gordonianus;* and *P. angustifolius* Rydberg[b] is described from specimens collected at "Palace Camp" on the Willis trail to Mount Rainier.

ROSACEAE. Rose Family.

- Carpels few, in fruit becoming 2 to several-seeded follicles or capsules; shrubs.
  - Leaves palmately lobed; pods 2-valved .... Opulaster (p. 329).
  - Leaves not palmately lobed.
    - Stamens united at base; leaves twice or thrice palmately 3-cleft; flowers racemose .... Lutkea (p. 329).
    - Stamens not united at base; flowers in panicles or corymbs.
      - Stamineal disk adherent, entire; ovules 2.......... Schizonotus (p. 330).
      - Stamineal disk free at the edge, not entire; ovules several.
        - Shrubs with simple leaves; flowers perfect..... Spiraea (p. 330).
        - Herbs with compound leaves; flowers dioecious. Aruncus (p. 332).
- Carpels few to many, becoming akenes or drupelets in fruit.
  - Fruit consisting of druplets, usually united .... Rubus (p. 332).
  - Fruit consisting of akenes.
    - Akenes in fruit inclosed in the more or less enlarged turbinate or campanulate receptacle.
      - Receptacle cup-shaped and fleshy in fruit; prickly shrubs with pinnate leaves...................... Rosa (p. 334).
      - Receptacle dry in fruit; herbs.
        - Petals yellow; calyx prickly.................. Agrimonia (p. 335).
        - Petals none; calyx not prickly.
          - Leaves palmately lobed; flowers axillary.. Alchemilla (p. 335).
          - Leaves pinnate; flowers spicate........... Sanguisorba (p. 335).
    - Akenes in fruit on a plane or merely concave receptacle.
      - Herbs.
        - Styles deciduous, naked, terminal or lateral.
          - Styles terminal.
            - Stamens inserted near the base of the receptacle cup on an annular thickening; flowers yellow .... Potentilla (p. 336).
            - Stamens inserted well up in the receptacle cup; no annular thickening... Horkelia (p. 339).
          - Styles lateral.
            - Carpels hairy; shrubs................ Dasiphora (p. 341).
            - Carpels glabrous; herbs.
              - Stamens 5; carpels 10 to 15; leaves trifoliolate .... Sibbaldia (p. 340).
              - Stamens 20; carpels numerous.
                - Leaves trifoliolate; receptacle fleshy in fruit; petals white. Fragaria (p. 340).
                - Leaves pinnate; receptacle not fleshy.

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[a] Gartenflora **1896**: 542. 1896.

[b] N. Am. Fl. **22**^{2}: 166. 1905.

Flowers dark purple; receptacle spongy........ Comarum (p. 341).
Flowers yellow; receptacle dry.
Plant stoloniferous; flowers solitary..... Argentina (p. 341).
Plant not stoloniferous; flowers cymose. Drymocallis (p. 342).
Styles persistent, terminal, mostly plumose or geniculate.
Calyx lobes and petals 8 or 9................ Dryas (p. 343).
Calyx lobes and petals 5.
Styles jointed, the upper part deciduous.. Geum (p. 343).
Styles not jointed, plumose or naked.... Sieversia (p. 344).
Shrubs or trees.
Styles very long and plumose in fruit; petals none. Cercocarpus (p. 345)
Styles short, naked; petals yellow............. Kunzia (p. 345).

OPULASTER. Ninebark.

Carpels pubescent, not exceeding the calyx........................... 1. *O. pauciflorus.*
Capsules glabrous, much exceeding the calyx.......................... 2. *O. opulifolius.*

1. **Opulaster pauciflorus** (Torr. & Gr.) Heller, Bull. Torr. Club **25**: 581. 1898.

Spiraea opulifolia pauciflora Torr. & Gr. Fl. **1**: 414. 1840.
Neillia malvacea Greene, Pittonia **2**: 30. 1889.
Opulaster malvaceus Greene, Erythea **2**: 194. 1895.
Physocarpus pauciflorus Piper, Fl. Palouse Reg. 94. 1901.

Type locality: Blue Mountains, Oregon. Collected by Nuttall.

Range: British Columbia to Utah and Montana.

Specimens examined: Fort Colville, *Lyall* in 1861; Spokane, *Piper* 2693; Rock Lake, *Sandberg & Leiberg* 102; Kamiak Butte, *Piper* 3088, 3557; *Elmer* 808; Blue Mountains, *Piper*, July 16, 1896; Clarks Springs, *Kreager* 35; Spokane, *Kreager* 625.

Zonal distribution: Arid Transition.

2. **Opulaster opulifolius** (L.) Kuntze, Rev. Gen. Pl. **2**: 989. 1891.

Spiraea opulifolia L. Sp. Pl. **1**: 489. 1753.
Neillia opulifolia Benth. & Hook.; Brewer & Wats. Bot. Cal. **1**: 171. 1876.
Physocarpa opulifolia Raf. New Fl. **3**: 73. 1836.
Spiraea capitata Pursh, Fl. **1**: 342. 1814.

Type locality: "In Virginia, Canada."

Range: Canada to Georgia and Kentucky; British Columbia to Oregon and Idaho.

Specimens examined: Clallam County, *Elmer* 2520; Cascade Mountains, latitude 49°, *Lyall* in 1859; Coupeville, *Gardner* 99; Seattle, *Piper* in 1885; Montesano, *Heller* 3858; Olympia, *Kincaid*, July 4, 1896; Chehalis County, *Lamb* 1154; Silverton, *Bouck* 46; Manor, *Piper* 3074; Roslyn, *Whited* 459; Klickitat River, *Flett* 1330; Blue Mountains, *Piper*, July, 1896.

Zonal distribution: Transition.

LUTKEA.

1. **Lutkea pectinata** (Pursh) Kuntze, Rev. Gen. Pl. **1**: 217. 1891.

Lutkea sibbaldioides Bong. Mem. Acad. St. Petersb. VI. **2**: 130. 1833.
Saxifraga pectinata Pursh, Fl. **1**: 312. 1814.
Eriogynia pectinata Hook. Fl. Bor. Am. **1**: 255. *pl. 88.* 1834.

Type locality: "Northwest coast." Collected by Menzies.

Range: Alaska to Mount Shasta and the Blue Mountains.

Specimens examined: Olympic Mountains, *Piper* 1992; *Elmer* 2531; Cascade Mountains, latitude 49°, *Lyall* in 1859; Silverton, *Bouck* 51; Mount Rainier, *Allen* 122; *Piper* 2041; Mount Adams, *Henderson*, August, 1892; *Suksdorf*, September, 1877; Skagit Pass, *Lake & Hull* 491; between Cascade Mountains and Colville, *Lyall* in 1860; Nason Creek, *Sandberg & Leiberg* 655; Bridge Creek, *Elmer* 639; without locality, *Vasey* in 1889.

Zonal distribution: Arctic.

SCHIZONOTUS.

1. **Schizonotus discolor** (Pursh) Raf. New Fl. 3: 75. 1836. Ocean spray.

Holodiscus discolor Maxim. Act. Hort. Petrop. 6: 254. 1879.

Spiraea discolor Pursh, Fl. 1: 342. 1814.

Spiraea ariaefolia Smith, Rees Cycl. 33: no. 16. 1816.

Type locality: "On the banks of the Kooskoosky." Collected by Lewis.

Range: British Columbia to Idaho and California.

Specimens examined: Clallam County, *Elmer* 2522; Cascade Mountains, latitude 49°, *Lyall* in 1859; Seattle, *Piper* 64; Port Ludlow, *Binns*; near Satsop, *Heller* 4025; upper Nisqually Valley, *Allen* 2; Atanum Soda Springs, *Watt*, August, 1895; Skagit Pass, *Lake & Hull*, August, 1892; Fort Vancouver, *Tolmie;* Peshastin, *Sandberg & Leiberg* 478; Wenache, *Whited* 1176; Ellensburg, *Whited* 543; Cowiche Creek, *Cotton* 466; Horseshoe Basin, *Elmer* 708; without locality, *Vasey* in 1889; Tukanon River, *Lake & Hull* 512; Loon Lake, *Winston*, July 20, 1897; Clarks Springs, *Kreager* 78; Mount Carlton, *Kreager* 261.

Zonal distribution: Transition, rarely Upper Sonoran.

SPIRAEA.

Low depressed shrubs with entire leaves.
Calyx lobes acute; leaves canescent........................... 1. *S. cinerascens.*
Calyx lobes obtuse; leaves glabrous........................... 2. *S. hendersonii.*
Taller shrubs with serrate or incised leaves.
Inflorescence pyramidal.
Leaves tomentose beneath; flowers red........................... 3. *S. douglasii.*
Leaves glabrous beneath.
Flowers red........................... 4. *S. menziesii.*
Flowers white........................... 5. *S. pyramidata.*
Inflorescence flat-topped..
Flowers red, crowded........................... 6. *S. densiflora.*
Flowers white, looser........................... 7. *S. corymbosa.*

1. **Spiraea cinerascens** Piper, Erythea 7: 171. 1899.

Type locality: "On bluffs of the Columbia River, Wash., 12 miles south of Chelan, in crevices of basaltic rock." Collected by Elmer.

Range: Known only from the type collection.

Specimens examined: Okanogan County, *Elmer* 910.

2. **Spiraea hendersoni** (Canby) Piper, Erythea 7: 171, 172. 1899.

Lutkea hendersoni Greene, Pittonia 2: 219. 1892.

Eriogynia hendersoni Canby, Bot. Gaz. 16: 236. 1891.

Type locality: Mount Steele, Olympic Mountains, Washington.

Range: Olympic Mountains.

Specimens examined: Olympic Mountains, *Piper* 910, 1991; *Elmer* 2517; *Henderson* 1874; Baldy Peak, *Lamb* 1374; Mount Storm King, *Lawrence* 344.

Zonal distribution: Hudsonian.

3. **Spiraea douglasii** Hook. Fl. Bor. Am. 1: 172. 1830.

Type locality: "North West coast of America about the Columbia and the Straits of De Fuca." Collected by Douglas and by Scouler.

Range: British Columbia to Oregon in the coast region.

Specimens examined: Clallam County, *Elmer* 2523; San Juan Island, *Lyall* in 1858; Muckleshoot Prairie, *Dr. Ruhn;* Shoalwater Bay, *J. G. Cooper* in 1854; Seattle, *Smith* 62; *Piper*, August, 1892; Tacoma, *Flett* 899; Woodlawn, *Henderson*, June, 1892.

Zonal distribution: Humid Transition.

4. **Spiraea menziesii** Hook. Fl. Bor. Am. **1**: 73. 1830.

Spiraea douglasii menziesii Presl, Epimel. Bot. 195. 1849.

Type locality: "North West coast of America." Collected by Menzies.

Range: Alaska to Idaho and California.

Specimens examined: Montesano, *Heller* 4004; Chehalis River, *Lamb* 1241; Cascade Mountains, latitude 49°, *Lyall* in 1859; upper Nisqually Valley, *Allen* 1; Cascade Mountains, *Henderson*, July, 1892; Ellensburg, *Elmer* 399; *Whited* 490; Fish Lake, *Dunn*, July 31, 1900; Skagit Pass, *Lake & Hull* 787; Lake Chelan, *Lake & Hull* 511; Peshastin, *Sandberg & Leiberg* 512; Columbia River, latitude 49°, *Lyall* in 1860; Palouse City, *Cloud*, June, 1895; without locality, *Vasey* in 1889; Mount Carlton, *Kreager* 193; Lake Chelan, *Cotton* 844.

Zonal distribution: Canadian and Arid Transition.

5. **Spiraea pyramidata** Greene, Pittonia **2**: 221. 1892.

Type locality: Clealum, Washington. Collected by Greene.

Range: Washington, Oregon, and Idaho.

Specimens examined: Cascade Mountains, latitude 49°, *Lyall* in 1859–60; Mount Adams, *Suksdorf* 115; Peshastin, *Sandberg & Leiberg* 514; Ellensburg, *Elmer* 411; North Yakima, *Watt*, August, 1895; Roslyn, *Whited* 463; Lake Keechelus, *Piper* 1112; near Leavenworth, *Whited* 188; Kittitas County, *Henderson* 2325; Horseshoe Basin, *Lake & Hull*, August, 1892; Fish Lake, *Dunn*, August, 1900; Loon Lake, *Winston*, July 20, 1897; without locality, *Vasey* in 1889.

Zonal distribution: Canadian.

6. **Spiraea densiflora** Nutt.; Torr. & Gr. Fl. **1**: 414. 1840.

Spiraea betulaefolia rosea A. Gray, Proc. Am. Acad. **8**: 381. 1872.

Spiraea arbuscula Greene, Erythea **3**: 63. 1895.

Type locality: Blue Mountains, Oregon. Collected by Nuttall.

Range: British Columbia to California and Idaho.

Specimens examined: Olympic Mountains, *Piper*, August, 1895; *Elmer* 2514; *Henderson* 245; Mount Rainier, *Piper* 1993; *Allen* 57; near Skagit Pass, *Lake & Hull* 510; Stevens Pass, *Sandberg & Leiberg* 712; Bridge Creek, *Elmer* 656.

Zonal distribution: Hudsonian.

7. **Spiraea corymbosa** Raf. Prec. Dec. 36. 1814.

Spiraea lucida Dougl.; Greene, Pittonia **2**: 221. 1892.

Type locality: "En Virginie."

Range: British Columbia to Oregon and the Black Hills; also Kentucky and New Jersey to Georgia.

Specimens examined: Cascade Mountains, latitude 49°, *Lyall* in 1859; Klickitat County, *Suksdorf;* Green River Hot Springs, *Piper* in 1887; Tieton River, *Cotton* 456; Roslyn, *Whited* 463; Wenache, *Whited* 188, 1184; Fort Vancouver, *Tolmie;* Peshastin, *Sandberg & Leiberg* 599; Columbia River, latitude 46° to 49°, *Lyall* in 1860; without locality, *Vasey* in 1889; Pullman, *Piper* 1522; *Hull*, May, 1892; Blue Mountains, *Lake* 509; Clarks Springs, *Kreager* 72; Vancouver, *Piper* 4941; Lake Chelan, *Cotton* 223.

Zonal distribution: Arid Transition.

In Cooper's Report this species was referred to *S. betulaefolia* Pallas.

ARUNCUS.

1. **Aruncus aruncus** (L.) Karst. Deutsch. Fl. 779. 1880–83. GOATSBEARD.

Spiraea aruncus L. Sp. Pl. 1: 490. 1753.

Aruncus sylvester Kostel. Ind. Hort. Prag. 15. 1844.

TYPE LOCALITY: "Habitat in Austriae, Alvorniae montanis."

RANGE: Alaska to Oregon and in the Eastern States from Iowa to Pennsylvania and southward. Europe. Asia.

SPECIMENS EXAMINED: Clallam County, *Elmer* 2527; Silverton, *Bouck* 50; Mount Stuart, *Sandberg & Leiberg* 561; Skokomish Valley, *Kincaid*, June, 1892; west Klickitat County, *Suksdorf*, August 7, 1886; Yakima Pass, *Watson;* Cascade Mountains, *Suksdorf*, 2044; Horseshoe Basin, *Lake & Hull* 507; Bridge Creek, *Elmer* 655; without locality, *Vasey* in 1889.

ZONAL DISTRIBUTION: Transition.

RUBUS.

Herbs; stems trailing, unarmed.
Leaves 3 to 5-lobed or rarely parted; carpels tomentose........ 1. *R. lasiococcus.*
Leaves 3 to 5-foliolate; carpels glabrous........................ 2. *R. pedatus.*
Shrubs.
Stems trailing, biennial.
Leaves shiny, 3-lobed or rarely 3-parted; berries red...... 3. *R. nivalis.*
Leaves dull, 3 to 5-foliolate; berries black................. 4. *R. macropetalus.*
Stems erect or ascending.
Leaves 3 to 5-lobed; stem unarmed, perennial............ 5. *R. parviflorus.*
Leaves 3 to 5-foliolate; stems prickly, mostly biennial.
Flowers red; fruit yellow or garnet.................... 6. *R. spectabilis.*
Flowers white; fruit black.
Stems perennial, very prickly; berry cylindric.... 10. *R. laciniatus.*
Stems biennial; berry hemispheric.
Berry red; stems not glaucous.............. 7. *R. strigosus.*
Berry black; stems glaucous.
Leaves glaucous beneath................ 8. *R. leucodermis.*
Leaves green beneath.................... 9. *R. hesperius.*

1. **Rubus lasiococcus** A. Gray, Proc. Am. Acad. 17: 201. 1882.

TYPE LOCALITY: "Near Mount Hood, Oregon."

RANGE: British Columbia to Oregon.

SPECIMENS EXAMINED: Chehalis County, *Lamb* 1403; Clallam County, *Elmer* 2524; Mount Rainier, *Allen* 124; *Piper* 1994; Mount Adams, *Suksdorf* 541, 10; Klickitat River, *Flett* 1336; Stevens Pass, *Whited* 1433; Stampede Pass, *Henderson*, June, October, 1892; Cascade Mountains near Berne, *Piper*, July, 1895; Yakima Pass, *Watson* 106; Nason Creek, *Sandberg & Leiberg* 664; without locality, *Vasey* in 1889.

ZONAL DISTRIBUTION: Hudsonian.

2. **Rubus pedatus** Smith, Ic. Pl. 3: *pl. 63.* 1791.

TYPE LOCALITY: "In Americae borealis tractu occidentali." Collected by Menzies.

RANGE: Alaska to California and Idaho.

SPECIMENS EXAMINED: Baldy Peak, *Lamb* 1304; Cascade Mountains, latitude 49°, *Lyall* in 1859; Mount Rainier, *Piper* 2042; *Allen* 280, 310a; Mount Adams, *Suksdorf* 540; Silverton, *Bouck* 57; Stampede Pass, *Henderson*, June, October, 1892; Okanogan County, *Elmer* 697; Stevens Pass, *Sandberg & Leiberg* 736; Cascade Mountains, latitude 49°, toward Colville, *Lyall;* without locality, *Vasey* in 1889.

ZONAL DISTRIBUTION: Canadian and Hudsonian.

3. **Rubus nivalis** Dougl.; Hook. Fl. Bor. Am. **1**: 181. 1833.

TYPE LOCALITY: "On the high snowy ridges of the Rocky Mountains." Collected by Douglas.

RANGE: Washington, Oregon, and Idaho.

SPECIMENS EXAMINED: Upper Nisqually Valley, *Allen* 78; Mashel Mountain, *Piper* 710; Silverton, *Bouck* 57a; Alma, *Piper* 1995; Olympic Mountains, *Piper* in 1890.

ZONAL DISTRIBUTION: Canadian.

This species is abundant in deep forests near the base of Mount Rainier. In such places, however, it never blooms. Fertile plants must be sought either in recent burns or on rocky outcroppings. The flowers are dull purplish in color.

4. **Rubus macropetalus** Dougl.; Hook. Fl. Bor. Am. **1**: 178. 1833. DEWBERRY.

TYPE LOCALITY: "In the valley of the Columbia." Collected by Douglas.

RANGE: British Columbia to Idaho and Oregon.

SPECIMENS EXAMINED: Clallam County, *Elmer* 2530; Montesano, *Heller* 3887; Hoquiam, *Lamb* 1017; Fairhaven, *Piper*, July, 1897; upper Nisqually Valley, *Allen* 79; De Fuca Straits, *Cooper;* Silverton, *Bouck* 58; Lakeview, *Henderson*, July, 1892; Tacoma, *Flett* 1; McAllisters Lake, *Henderson*, June, 1892; Yakima Pass, *Watson;* Skokomish Valley, *Kincaid*, May, 1892; Nason Creek, *Sandberg & Leiberg* 649; without locality, *Vasey* in 1889; Roslyn, *Whited* 408.

ZONAL DISTRIBUTION: Humid Transition.

This species is very close to *R. ursinus* Cham. & Schlecht. of California, but it seems distinct. It never has unifoliolate leaves, which are so commonly produced in the latter. The plant referred by Cooper to *R. trivialis* Michx. is probably *R. macropetalus*, but we have been unable to find the specimen.

5. **Rubus parviflorus** Nutt. Gen. **1**: 308. 1818. THIMBLE BERRY.

Rubus nutkanus Moç.; DC. Prod. **2**: 566. 1825.

Rubus velutinus Hook. & Arn. Bot. Beech. 140. 1832.

TYPE LOCALITY: "Island of Michilimackinack, Lake Huron."

RANGE: Alaska to California, New Mexico, and Lake Superior.

SPECIMENS EXAMINED: Clallam County, *Elmer* 2518; Seattle, *Piper* 66; Tacoma, *Flett* 13; Mount Adams, *Suksdorf* 1758; Muckleshoot, *Doctor Ruhn*; Silverton, *Bouck* 53; Skokomish Valley, *Kincaid*, May, 1892; upper Nisqually Valley, *Allen* 25; Peshastin, *Sandberg & Leiberg* 542; Falcon Valley, *Suksdorf* 1758; Tieton River, *Cotton* 455; Roslyn, *Whited* 400; without locality, *Vasey* in 1889; Kamiak Butte, *Elmer* 804; *Piper*, July 20, 1899; Skagit Pass, *Lake & Hull*, August, 1892; Blue Mountains, *Lake & Hull* 502; Clarks Springs, *Kreager* 38.

ZONAL DISTRIBUTION: Transition.

6. **Rubus spectabilis** Pursh, Fl. **1**: 348. 1814. SALMON BERRY.

TYPE LOCALITY: "On the banks of the Columbia." Collected by Lewis, the exact locality very near Deer Island.

RANGE: Alaska to northern California and north Idaho. In Washington it ascends to 1,600 feet altitude.

SPECIMENS EXAMINED: Clallam County, *Elmer* 2513; Port Ludlow, *Binns*, April 10, 1889; Roy, *Allen* 97; Silverton, *Bouck* 56; Seattle, *Piper* 67; Tacoma, *Flett* 110; Woodlawn, *Henderson*, June, 1892; upper Nisqually Valley, *Allen* 26; Stampede Tunnel, *Henderson*, June, 1892; Skagit Pass, *Lake & Hull* 503; Stevens Pass, *Sandberg & Leiberg* 726; without locality, *Vasey* in 1889.

ZONAL DISTRIBUTION: Humid Transition.

Two forms of this species occur, one with claret-colored or nearly black fruit, the other with yellow fruit, the latter being the better flavored. The former may be distinguished even in flower by the purple color of its twigs.

7. **Rubus strigosus** Michx. Fl. 1: 297. 1803. RED RASPBERRY.

TYPE LOCALITY: "In montibus Pennsylvania et in Canada."

RANGE: British Columbia to Labrador, southward to New Mexico and North Carolina.

SPECIMENS EXAMINED: Fort Colville, *Watson;* Horseshoe Basin, *Elmer*, September, 1897; without locality, *Brandegee* 739; Spokane, *Piper* 2268; along Salmon River, *Horner* 295.

ZONAL DISTRIBUTION: Arid Transition and Canadian.

8. **Rubus leucodermis** Dougl.; Torr. & Gr. Fl. 1: 454. 1838. BLACKCAP.

TYPE LOCALITY: "North West Coast of America."

RANGE: British Columbia to California and Wyoming.

SPECIMENS EXAMINED: Clallam County, *Elmer* 2516; Cascade Mountains, latitude 49°, *Lyall* in 1858–59; near Satsop, *Heller* 4033; Seattle, *Piper* 68; Tacoma, *Flett* 16; upper Nisqually Valley, *Allen* 24; Kittitas County, *Sandberg & Leiberg* 704; Skagit Pass, *Lake & Hull* 500; Snake River Bluffs, Bishops Bar, *Piper* 2881; Blue Mountains, *Piper* 2400.

ZONAL DISTRIBUTION: Transition.

9. **Rubus hesperius** Piper, Erythea 5: 103. 1898.

TYPE LOCALITY: "Snake River Cañon at Wawawai and Almota, Whitman County, Washington."

RANGE: Eastern Washington.

SPECIMENS EXAMINED: West Klickitat County, *Suksdorf* 116; Almota, *Piper* 1552; Wawawai, *Piper* 1788.

ZONAL DISTRIBUTION: Upper Sonoran.

10. **Rubus laciniatus** Willd. Hort. Berol. *pl.* *82.* 1816. EVERGREEN BLACKBERRY.

TYPE LOCALITY: Not known.

SPECIMENS EXAMINED: Montesano, *Heller* 4001; Ilwaco, *Piper.*

This species readily escapes from cultivation and along the coast is becoming abundantly established in the woodlands.

ROSA. ROSE.

Calyx lobes deciduous from the oblong fruit; flowers small............ 1. *R. gymnocarpa.*
Calyx lobes persistent; flowers large.
  Flowers mostly solitary; fruit globose, 2 cm. broad.............. 2. *R. nutkana.*
  Flowers in corymbs; fruit ovoid or oblong, 1 cm. broad or less.... 3. *R. pisocarpa.*

1. **Rosa gymnocarpa** Nutt.; Torr. & Gr. Fl. 1: 461. 1840.

TYPE LOCALITY: Oregon. Collected by Nuttall.

RANGE: British Columbia to Idaho and middle California.

SPECIMENS EXAMINED: Clallam County, *Elmer* 2515; Montesano, *Heller* 3897; Silverton, *Bouck* 60; upper Nisqually Valley, *Allen* 72; Falcon Valley, *Suksdorf* 359; Mount Adams, *Flett* 1333; Trout Lake, *Flett* 1338; Clealum, *Henderson*, October, 1892; Chambers Prairie, *Henderson*, August, 1892; without locality, *Vasey* in 1889; without locality, *Cooper* in 1851; Columbia woods, *Nuttall;* Fort Colville, *Watson;* Kamiak Butte, *Piper*, July 20, 1899; Blue Mountains, *Piper*, August, 1896.

ZONAL DISTRIBUTION: Transition.

2. **Rosa nutkana** Presl, Epimel. Bot. 203. 1849.

TYPE LOCALITY: Nutka Sound. Collected by Haenke.

RANGE: Sitka to California and Utah.

SPECIMENS EXAMINED: Near Montesano, *Heller* 3875; Seattle, *Piper* 81; *Engelmann & Sargent*, July 18, 1880; Port Ludlow, *Binns;* Goat Mountains, *Allen* 292; near Skagit Pass, *Lake & Hull* 770; Roslyn, *Whited* 464; Wenache Region, *Brandegee* 753; Wenache Mountains, *Whited* 1268; Klickitat River, *Flett* 1407; west Klickitat County, *Suksdorf*

633, 631, 632, 178, 177; without locality, *Vasey* in 1889; Fort Colville, *Watson* 119; Pullman, *Piper* 1539; Clallam County, *Elmer* 2519; Stehekin, *Griffiths & Cotton* 222.

Zonal distribution: Transition.

2a. Rosa nutkana macdougali (Holzinger).

Rosa nutkana hispida Fernald, Bot. Gaz. **19**: 335. 1894, not *Rosa hispida* Moench. 1770.

Rosa macdougali Holzinger, Bot. Gaz. **21**: 36. 1896.

Type locality: Canyons near Farmington Landing, south end of Lake Coeur d'Alene, Idaho.

Range: Eastern Washington to Montana and Oregon.

Specimens examined: Pullman, *Piper* 1540.

Zonal distribution: Arid Transition.

3. Rosa pisocarpa A. Gray, Proc. Am. Acad. **8**: 382. 1872.

Type locality: Oregon. Collected by Hall.

Range: British Columbia to California and Utah.

Specimens examined: Satsop, *Heller* 4032; Seattle, *Piper*, September, 1896, October; 1892; Port Orchard, *Piper*, July, 1895; Ellensburg, *Whited* 677, 443; Port Ludlow, *Binns* 625, 628, 180, 181; Wenache, *Whited* 1125, 1334; North Yakima, *Steinweg* in 1894; near North Yakima, *Henderson*, May, 1892; Prosser, *Henderson*, May, 1892; Rattlesnake Mountains, *Cotton* 469; Clealum, *Henderson*, June, 1892; upper Nisqually Valley, *Allen* 123; Klickitat County, *Suksdorf* 623, 621, 627, 179, 182, 620, 629; Colville, *Watson* 120; without locality, *Vasey* in 1889; *Kreager* 47; Crab and Wilson creeks, *Sandberg & Leiberg* 320; Tukanon River, *Lake & Hull* 819; Pullman, *Piper* 1538, 1541, July, 1893.

The typical form of this species occurs west of the Cascade Mountains. The eastern Washington forms are very variable as to leaf and fruit and consist perhaps, of two species. Specimens have frequently been referred to as *Rosa fendleri* Crepin, but it is not at all clear how this is to be distinguished.

Rosa californica Cham. & Schlecht, in typical form at least, seems not to reach Washington. Specimens so referred are probably forms of *R. pisocarpa*.

AGRIMONIA.

1. Agrimonia gryposepala Wallr. Beitr. Bot. **1**: 49. 1842.

Type locality: "Auf frein Grassplatzen Pennsylvaniens und auf den Anhöhen des Berges 'Peaks of Otter.'"

Range: British Columbia and Northern Washington to New Brunswick, south to North Carolina and Kansas.

We have seen no Washington specimens of this plant, but under the name of *A. eupatoria* L. it is reported by Lyall "along the banks of the Sumass Lake and River and on the clear grounds or prairies of the same name."

ALCHEMILLA.

1. Alchemilla arvensis occidentallis (Nutt.) Piper, Fl. Palouse Reg. 96. 1901.

Alchemilla occidentalis Nutt.; Torr. & Gr. Fl. **1**. 432. 1840.

Type locality: "Rocky plains of the Oregon toward the sea." Collected by Nuttall.

Range: British Columbia to Idaho and California.

Specimens examined: Whidby Island, *Gardner* 184; Seattle, *Piper* 602; west Klickitat County, *Suksdorf* 1765; Pullman, *Piper*, May, 1894.

Zonal distribution: Transition.

SANGUISORBA.

Annual; flowers greenish .... 1. *P. annua.*
Perennial; flowers white or reddish .... 2. *P. latifolia.*

1. Sanguisorba annua Nutt.; Torr. & Gr. Fl. **1**: 429. 1840.

Sanguisorba occidentalis Nutt.; Torr. & Gr. Fl. **1**: 429. 1840.

Poterium annuum Nutt.; Hook. Fl. Bor. Am. 1: 198. 1834.

TYPE LOCALITY: "Red River in Louisiana."

RANGE: Vancouver Island to California and Arkansas.

SPECIMENS EXAMINED: Klickitat County, *Howell;* Fourth Plain, *Piper*, July 14, 1899; Pullman, *Piper* 1537; Clarks Springs, *Kreager* 106.

ZONAL DISTRIBUTION: Arid Transition.

2. **Sanguisorba latifolia** (Hook.) Coville, Contr. Nat. Herb. 3: 339. 1896.

Sanguisorba canadensis latifolia Hook. Fl. Bor. Am. 1: 198. 1834.

Sanguisorba sitchensis C. A. Meyer; Trautv. & Meyer, Fl. Ochot. 35. 1856.

Poterium sitchense S. Wats. Bibl. Ind. 303. 1878.

TYPE LOCALITY: "Observatory Inlet." Collected by Scouler.

RANGE: Alaska to Oregon and Idaho.

SPECIMENS EXAMINED: Silverton, *Bouck* in 1889; Snoqualmie Pass, *Piper;* Big Creek Prairie, *Lamb* 1394; Fort Vancouver, collector not indicated; Skamania County, *Suksdorf* 966; Blue Mountains, *Horner* 415.

ZONAL DISTRIBUTION: Canadian.

The red-flowered form of this species is referred by Howell[a] to *S. officinalis* L. The white-flowered ordinary form was referred to *S. media* L. in Hooker's Flora. It is also the basis for the entry "*Poterium canadense* B. & H.?" of Suksdorf's list.

POTENTILLA.

Cymes leafy; annuals or biennials with small flowers.
Lower leaves pinnate, upper ternate .... 1. *P. rivalis.*
Leaves all ternate.
Petals as long as the sepals .... 2. *P. monspeliensis.*
Petals much shorter than the sepals.
Cymes loose, rather broad; leaflets oblanceolate...... 3. *P. millegrana.*
Cymes narrow, elongated; leaflets obovate........... 4. *P. biennis.*
Cymes not leafy; perennials.
Leaves pinnate.
Flowers white; receptacle long-bristly .... 16. *P. newberryi.*
Flowers yellow; receptacle not long-bristly.
Calyx silky; leaflets 1 to 2 cm. long.................. 14. *P. cascadensis.*
Calyx hairy; leaflets 2 to 6 cm. long .... 15. *P. drummondii.*
Leaves digitate.
Leaflets 3.
Plant densely silky-villous .... 12. *P. villosa.*
Plant glabrous or nearly so .... 13. *P. flabellifolia.*
Leaflets 5 to 9.
Low alpine plant, 20 to 30 cm. high; cyme few flowered. 5. *P. dissecta.*
Taller lowland plants, 40 to 80 cm. high; cymes many flowered.
Leaflets pubescent on both sides.
Pubescence tomentose .... 6. *P. permollis.*
Pubescence grayish-silky .... 7. *P. fastigiata.*
Leaflets glabrous at least above.
Under side of leaves white tomentose.
Teeth of the leaflets triangular .... 8. *P. gracilis.*
Teeth of the leaflets elongate .... 9. *P. blaschkeana.*
Under side of leaves green.
Leaflets slightly tomentose beneath .... 10. *P. viridescens.*
Leaflets glabrous on both sides .... 11. *P. nuttallii.*

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[a] Fl. N. W. Am. 170. 1898.

1. **Potentilla rivalis** Nutt.; Torr. & Gr. Fl. 1: 437. 1840.
Type locality: "In alluvial soil along the Lewis River." Collected by Nuttall.
Range: Washington and Saskatchewan to Mexico.
Specimens examined: Almota, *Piper* 2734.
Zonal distribution: Upper Sonoran.

2. **Potentilla monspeliensis** L. Sp. Pl. 1: 499. 1753.
Potentilla hirsuta Michx. Fl. 1: 303. 1803.
Potentilla norvegica American authors.
Type locality: "Monspelii."
Range: Labrador to Virginia and westward. Asia.
Specimens examined: Latitude 49°, *Lyall* in 1858–9: Green River Hot Springs, *Piper* 441; Yelm Prairie, *Piper* 483; Segualiche Lake, *Piper* 442; Silverton, *Bouck* 51a; Marshall Junction, *Piper* 2256.
Zonal distribution: Transition and Canadian.

3. **Potentilla millegrana** Engelm.; Lehm. Ind. Sem. Hort. Hamb. **1849**: 11. 1849.
Potentilla leucocarpa Rydberg in Britt. & Br. Ill. Fl. 2: 212. 1897.
Type locality: America borealis.
Range: Washington to Illinois, California, and New Mexico.
Specimens examined: Tacoma, *Flett* 879, 68, 22; west Klickitat County, *Suksdorf* 1760; Mission, *Kreager* 491.
Zonal distribution: Arid Transition.

4. **Potentilla biennis** Greene, Fl. Fran. 1: 65. 1891.
Potentilla lateriflora Rydberg, Bull. Torr. Club **23**: 261. 1896.
Type locality: California "in moist places in the mountains from Butte Co. to Kern and San Luis Obispo."
Range: British Columbia and Assiniboia to California and Arizona.
Specimens examined: Tacoma, *Flett* 22, 68, 877; Clealum, *Henderson*, August, 1892; Wenache, *Whited* 76, 1077; Ellensburg, *Whited* 458; *Elmer* 381; *Piper*, May, 1897; Pasco, *Hindshaw* 42; Crab and Wilson creeks, *Sandberg & Leiberg* 279; Almota, *Lake & Hull* 521; *Piper* 1847; without locality, *Vasey* 313; Meyers Falls, *Kreager* 501.
Zonal distribution: Arid Transition.

5. **Potentilla dissecta** Pursh, Fl. 1: 355. 1814.
Potentilla diversifolia Lehm. Nov. Stirp. Pug. 2: 9. 1830.
Type locality: "Near Hudson's Bay."
Range: British Columbia and Saskatchewan to California and Colorado.
Specimens examined: Goat Mountains, *Allen* 121, 251; Cascade Mountains to Fort-Colville, latitude 49°, *Lyall* in 1860; without locality, *Vasey*; Wenache Creek, *Cotton* 1650, 1232.

5a. **Potentilla dissecta glaucophylla** (Lehm.) S. Wats. Proc. Am. Acad. **8**: 556. 1873.
Potentilla diversifolia glaucophylla Lehm. Rev. Pot. 73. 1856.
Type locality: Black Hills. Collected by Nuttall.
Range: California to Colorado and northward.
Specimens examined: Mount Rainier, *Piper* 1998.

6. **Potentilla permollis** Rydberg, Bull. Torr. Club **28**: 175. 1901.
Type locality: Endicott, Whitman County, Washington. Collected by Elmer.
Range: Eastern Washington.
Specimens examined: Crab and Wilson creeks, *Sandberg & Leiberg* 315; Endicott *Elmer* 1830; without locality, *Vasey* in 1889.
Zonal distribution: Arid Transition.

7. **Potentilla fastigiata** Nutt.; Torr. & Gr. Fl. **1**: 440. 1840.

Type locality: "Plains of the Rocky Mountains."

Range: Washington to Saskatchewan, south to California.

Specimens examined: Klickitat County, *Suksdorf* 2488.

8. **Potentilla gracilis** Dougl.; Hook. Bot. Mag. **57**: *pl. 2984*. 1830.

Type locality: "On the banks of the Columbia and the plains of the Multnomah rivers." Collected by Douglas.

Range: Alaska to Oregon in the coast region.

Specimens examined: Olympic Mountains, *Flett* 108; Whidby Island, *Gardner* 97; Coupeville, *Gardner*, July, 1898; Port Townsend, *Edwards* in 1896; Tacoma, *Flett* 900; Olympia, *Kincaid*, July, 1896; Muckleshoot Prairie, *Doctor Ruhn;* Manor, *Piper*, July 14, 1899; Falcon Valley, *Suksdorf* 325; Fort Vancouver, *Tolmie; Scouler; Piper* 4937; Cape Horn, *Piper* 5017.

Zonal distribution: Humid Transition.

9. **Potentilla blaschkeana** Turcz.; Lehm. in Otto, Gart. & Blum. **9**: 506. 1853.

Potentilla flabelliformis ctenophora Rydberg, Bull. Torr. Club **24**: 7. 1897.

Potentilla ctenophora Rydberg, Mon. N. A. Pot. 75. 1898.

Type locality: In the Russian American Colonies, California.

Range: British Columbia to California and Wyoming.

Specimens examined: Pullman, *Piper* 1529, 3534, 3535, 4134, 4135; Clarks Springs, *Kreager* 21; Wenache, *Whited* 146, 1303; without locality, *Vasey* in 1889; Spokane County, *Mrs. Tucker*.

Zonal distribution: Arid Transition.

10. **Potentilla viridescens** Rydberg, Mon. N. A. Pot. 69, 1898.

Type locality: "Manitoba."

Range: Washington to Colorado and Manitoba.

Specimens examined: North Yakima, *Watt;* Ellensburg, *Piper* 2736; Klickitat Meadows, *Flett* 1326; Rattlesnake Mountains, *Cotton* 423; Fresh Lake, *McKay* 13; without locality, *Vasey* in 1889; Wilson Creek, *Lake & Hull* 518; Toppenish, *Cotton* 781; Snipes Creek, *Cotton* 662; Blue Mountains, *Piper* 2445; Wenache Mountains, *Cotton* 1646; Satus, *Cotton* 1125.

Zonal distribution: Upper Sonoran and Arid Transition.

11. **Potentilla nuttallii** Lehm. Ind. Sem. Hort. Hamb. **1852**: 12. 1852.

Potentilla recta Nutt. Gen. **1**: 310. 1818, not L. 1753.

Potentilla rigida Nutt. Journ. Acad. Phila. **7**: 20. 1834, not Wall.

Potentilla gracilis rigida S. Wats. Proc. Am. Acad. **8**: 557. 1873.

Type locality. "On the Missouri from Fort Mandan to the Rocky Mountains." Collected by Nuttall.

Range: British Columbia and Saskatchewan to California and Colorado.

Specimens examined: North Yakima, *Watt*, August, 1895; Pullman, *Elmer* 69; *Piper* 1877; without locality, *Vasey* 322.

Zonal distribution: Arid Transition.

12. **Potentilla villosa** Pall.; Pursh, Fl. **1**: 353. 1814.

Potentilla fragiformis villosa Regel & Tiling, Fl. Ajan. Nov. Mem. Soc. Mosc. **11**; 85. 1859.

Type locality: "On the northwest coast."

Range: Alaska to Mount Rainier, Washington.

Specimens examined: Olympic Mountains, *Flett* 129; Mount Rainier, *Piper* 1999; *Smith* 783.

Zonal distribution: Arctic.

13. **Potentilla flabellifolia** Hook.; Torr. & Gr. Fl. **1**: 442. 1838.

Potentilla gelida American authors, not Meyer.

Type locality: "Summit of Mount Rainier, Oregon, *Douglas*." The specimen was probably collected by Tolmie, as Douglas was never on Mount Rainier.

Range: Alaska to Oregon in the mountains.

Specimens examined: Clallam County, *Elmer* 2521; Cascade Mountains, latitude 49°, *Lyall* in 1859; Mount Rainier, *Piper* 1996; *Allen; Smith* 396; Mount Adams, *Henderson*, August, 1892; *Suksdorf; Flett* 1331; Stevens Pass, *Sandberg & Leiberg*, 717; Horseshoe Basin, *Lake & Hull* 520; Bridge Creek, *Elmer* 648; without locality, *Brandegee* 744.

Zonal distribution: Arctic.

14. **Potentilla cascadensis** Rydberg, Mon. N. A. Pot. 109. 1898.

Type locality: Chiquash Mountains, Washington. Collected by Suksdorf.

Range: Washington and Oregon in the Cascade Mountains.

Specimens examined: Near Mount Adams, *Flett;* Chiquash Mountains, *Suksdorf* 2165; Olympic Mountains, *Elmer* 2523.

15. **Potentilla drummondii** Lehm. Nov. Stirp. Pug. **2**: 9. 1830.

Type locality: "Rocky Mountains north of the Smoking River, in lat. 56°, scarce. *Drummond*"—according to Hooker.[a] Lehmann does not note the locality of his specimens which however, were received from Hooker.

Range: British Columbia and Alberta to California.

Specimens examined: Mount Adams, *Suksdorf* 539.

16. **Potentilla newberryi arenicola** Rydberg, Mon. N. A. Pot. 112. 1898.

Type locality: Wallula, Wash. Collected by Howell.

Range: Eastern Washington and eastern Oregon.

Specimens examined: Wallula, *Howell.*

HORKELIA.

Filaments dilated; flowers white.
  Leaflets deeply dentate.................................... 1. *H. fusca.*
  Leaflets lobed nearly to the midrib......................... 1b. *H. fusca tenella.*
Filaments filiform; flowers yellow.
  Cymes rather loose; receptacle cup shallow.................. 2. *H. utahensis.*
  Cymes subcapitate; receptacle cup deep...................... 3. *H. gordoni alpicola.*

1. **Horkelia fusca** Lindl. Bot. Reg. **23**: *pl. 1997.* 1837.

Potentilla douglasii Greene, Pittonia **1**: 103. 1887.

Type locality: "In California." Collected by Douglas.

Range: Washington to California.

Specimens examined: Mount Adams, *Henderson* in 1892; without locality, *Vasey* in 1889, August 7, 1882.

1b. **Horkelia fusca tenella** S. Wats. in Brewer & Wats. Bot. Cal. **1**: 181. 1876.

Horkelia tenella Rydberg, Bull. Torr. Club **25**: 55. 1898.

Type locality: Sierra County, California.

Range: California to Washington.

Specimens examined: Klickitat River, *Flett* 1334.

2. **Horkelia utahensis** (S. Wats.) Rydberg, Mon. N. A. Pot. 150. 1898.

Ivesia utahensis S. Wats. Proc. Am. Acad. **17**: 371. 1882.

Type locality: "Summit of Bald Mountain in the Wasatch range, above Alta, at over 12000 feet altitude," Utah.

Range: Washington to California and Utah.

Specimens examined: Cascade Mountains, *Brandegee* in 1883; Mount Stuart, *Elmer;* without locality, *Vasey* in 1889.

Zonal distribution: Arctic.

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[a] Fl. Bor. Am. **1**: 190. 1838.

3. **Horkelia gordoni alpicola** Rydberg, Mon. N. A. Pot. 152. 1898.
Ivesia alpicola Rydberg; Howell, Fl. N. W. Am. 1: 182. 1898.
TYPE LOCALITY: Mount Adams, Washington.
RANGE: Washington to Montana and California.
SPECIMENS EXAMINED: Mount Adams, *Henderson* in 1892; *Flett* 1020; Blue Mountains, *Piper*, July, 1896; *Horner* 424.
ZONAL DISTRIBUTION: Arctic.

SIBBALDIA.

1. **Sibbaldia procumbens** L. Sp. Pl. 1: 284. 1753.
TYPE LOCALITY: "Habitat in Alpibus Lapponiae, Helvetiae, Scothiae."
RANGE: Alaska and Greenland, southward to California, Colorado, and the White Mountains. Europe. Asia.
SPECIMENS EXAMINED: Olympic Mountains, *Piper*, August, 1895; Mount Rainier, *Piper* 2024; *Allen* 64; Mount Stuart, *Brandegee* 748; east Cascade Mountains, latitude 49°, *Lyall* in 1860; Blue Mountains, *Piper*, July, 1896.
ZONAL DISTRIBUTION: Arctic.

FRAGARIA. STRAWBERRY.

Leaves thick, silky and tomentulose beneath.
Leaflets cuneate; flowers 1.5 to 2 cm. broad........................ 1. *F. cuneifolia.*
Leaflets broadly obovate; flowers 2 to 3.5 cm. broad.
Leaves strongly reticulate beneath............................ 2. *F. chiloensis.*
Leaves not strongly reticulate beneath........................ 3. *F. crinita.*
Leaves not at all tomentulose.
Leaflets thin subsessile, pale green; akenes superficial.
Flowers white .... 4. *F. bracteata.*
Flowers pink .... 5. *F. helleri.*
Leaflets somewhat glaucous, thicker, petiolulate; akenes set in pits;
flowers white... 6. *F. platypetala.*

1. **Fragaria cuneifolia** Nutt.; Howell, Fl. N. W. Am. 1: 174. 1898.
TYPE LOCALITY: Oregon. Collected by Nuttall.
RANGE: British Columbia to Oregon.
SPECIMENS EXAMINED: Falcon Valley, *Suksdorf* 486; Palace Camp, Pierce County, *Mrs. Bailey Willis* in 1883.
This is probably not distinct from *F. chiloensis.*

2. **Fragaria chiloensis** (L.) Duch. Hist. Nat. Frais. 165. 1766
Fragaria vesca chiloensis L. Sp. Pl. 1: 495. 1753.
Fragaria chiloensis scouleri S. Wats. Bibl. Ind. 282. 1878.
TYPE LOCALITY: "In arvis circa civitatem Conception," Chile.
RANGE: British Columbia to California. Chile.
SPECIMENS EXAMINED: Clallam County, *Elmer* 2528; Humptulips, *Lamb* 1098a; Ilwaco, *Piper* 4993.
ZONAL DISTRIBUTION: Humid Transition.

3. **Fragaria crinita** Rydberg, Mon. N. A. Pot. 171. 1898.
TYPE LOCALITY: Washington. Collected by the Wilkes Expedition.
RANGE: Washington to California.
SPECIMENS EXAMINED: Admiralty Head, *Piper*, April 17, 1898; Easton, *Whited* 147; Roslyn, *Whited* 418; Mount Storm King, *Lawrence* 337.

4. **Fragaria bracteata** Heller, Bull. Torr. Club 25: 194. 1896.
TYPE LOCALITY: Santa Fe, New Mexico.
RANGE: British Columbia to California and New Mexico.

SPECIMENS EXAMINED: Whidby Island, *Gardner* 102; Lopez Island, *Lyall* in 1858; Silverton, *Bouck* 54; Cascade Mountains, latitude 49°, *Lyall;* Skokomish River, *Kincaid*, June 9, 1892; west Klickitat County, *Suksdorf* 117.

ZONAL DISTRIBUTION: Transition.

5. **Fragaria helleri** Holzinger, Bot. Gaz. **21**: 36. 1896.

TYPE LOCALITY: Idaho.

RANGE: Idaho and Washington.

SPECIMENS EXAMINED: Olympia, *Henderson* in 1892; Woodlawn, *Henderson* in 1892. These specimens may really be forms of the preceding.

6. **Fragaria platypetala** Rydberg, Mon. N. A. Pot. 177. 1898.

TYPE LOCALITY: Alaska.

RANGE: Alaska to California and Colorado.

SPECIMENS EXAMINED: Along Twisp River, *Whited* 180; Klickitat River, *Flett* 1408; Rock Creek, *Sandberg & Leiberg* 86; without locality, *Vasey* in 1889; Spokane Valley *Lyall* in 1861; Spokane, *Piper*, May 16, 1896; Marshall Junction, *Piper*, July, 1896; Mount Carlton, *Kreager* 262.

ZONAL DISTRIBUTION: Arid Transition.

This is the western representative of *F. virginiana* Duch., to which it has been referred.

ARGENTINA.

1. **Argentina anserina** (L.) Rydberg, Mon. N. A. Pot. 159. 1898.

Potentilla anserina L. Sp. Pl. **1**: 495. 1753.

Potentilla anserina grandis Torr. & Gr. Fl. **1**: 444. 1840.

Potentilla pacifica Howell, Fl. N. W. Am. 179. 1898.

TYPE LOCALITY: "Habitat in Europae pascuis; in argillosis argentea."

RANGE: Circumboreal, extending southward in North America to New Jersey, Arizona, and California.

SPECIMENS EXAMINED: Hoquiam, *Lamb* 1080; Clallam County, *Elmer* 2525; Orchard Point, *Piper*, July, 1895; Tacoma, *Flett* 212; Ilwaco, *Piper* 4920.

ZONAL DISTRIBUTION: Humid Transition.

1a. **Argentina anserina concolor** Rydberg, Mon. N. A. Pot. 160. 1898.

Potentilla anserina concolor Ser. in DC. Prod. **2**: 582. 1825.

TYPE LOCALITY: None given.

RANGE: Alaska to New Mexico. Maine. Siberia.

SPECIMENS EXAMINED: Along Methow River, *Whited* 9, 226; Alma, *Elmer* 545; Cascade Mountains to Fort Colville, *Lyall* in 1860; Spangle, *Piper*, May 31, 1901; Marshall Junction, *Piper* 2255; without locality, *Vasey* 319; Mission, *Kreager* 485.

ZONAL DISTRIBUTION: Arid Transition.

COMARUM.

1. **Comarum palustre** L. Sp. Pl. **1**: 502. 1753.

Potentilla palustris Scop. Fl. Carn. ed. 2. **1**: 359. 1772.

TYPE LOCALITY: European.

RANGE: Northern portion of North America. Europe. Asia.

SPECIMENS EXAMINED: Port Ludlow, *Binns;* Seattle, *Piper*, July, 1892; White Salmon *Suksdorf;* Marshall Junction, *Piper*, July, 1896; Big Meadows, Stevens County, *Kreager* 427.

ZONAL DISTRIBUTION: TRANSITION.

DASIPHORA.

1. **Dasiphora fruticosa** (L.) Rydberg, Mon. N. A. Pot. 188. 1898.

Potentilla fruticosa L. Sp. Pl. **1**: 495. 1753.

TYPE LOCALITY: "Habitat in Eboraco, Anglia, Oelandia australi, Sibiria."

RANGE: Alaska to Labrador, southward to California, New Jersey, and New Mexico. Europe. Asia.

SPECIMENS EXAMINED: Cascade Mountains to Colville, *Lyall* in 1860; without locality, *Vasey* 316; Mission, *Kreager* 490; Wenache Mountains, *Cotton* 1651½.

ZONAL DISTRIBUTION: Canadian?

1a. Dasiphora fruticosa tenuifolia (Willd.) Rydberg, Mon. N. A. Pot. 190. 1898.

Potentilla tenuifolia Willd.; Schlecht. Mag. Ges. Naturf. Freunde Berlin **7**: 285. 1813.

Potentilla fruticosa tenuifolia Lehm. Monog. Pot. 20 1820.

TYPE LOCALITY: "Aus Sibirien."

RANGE: Same as of the preceding.

SPECIMENS EXAMINED: Olympic Mountains, *Grant* in 1889; Mount Rainier, *Piper* 1997; Wenache Mountains, *Elmer* 462; Horseshoe Basin, *Lake & Hull* 519.

ZONAL DISTRIBUTION: Hudsonian.

DRYMOCALLIS.

- Style filiform, more than twice as long as the akenes .... 1. *D. rhomboidea.*
- Style filiform, less than twice as long as the akenes.
  - Flowers cream-color.
    - Stems 20 to 50 cm. high; alpine plant.................... 2. *D. pseudorupestris.*
    - Stems 30 to 100 cm. high; lowland plant................. 3. *D. convallaria.*
  - Flowers yellow.
    - Sepals broadly ovate .... 7. *D. wrangeliana.*
    - Sepals lanceolate to ovate.
      - Herbage nearly glabrous.............................. 6. *D. glabrata.*
      - Herbage very glandular.
        - Petals much larger than the sepals............... 4. *D. valida.*
        - Petals scarcely larger than the sepals............ 5. *D. glandulosa.*

1. Drymocallis rhomboidea Rydberg, Mon. N. A. Pot. 203. 1898.

Potentilla rhomboidea Rydberg, Bull. Torr. Club **23**: 248. 1896.

TYPE LOCALITY: Nevada. Collected by Watson.

RANGE: Washington to Montana, Nevada, and Oregon.

SPECIMENS EXAMINED: Mount Adams, *Suksdorf* 119; *Flett* 1332.

2. Drymocallis pseudorupestris Rydberg, Mon. N. A. Pot. 194. 1898.

Potentilla pseudorupestris Rydberg, Bull. Torr. Club **24**: 250. 1897.

Potentilla glandulosa nevadensis S. Wats. in Brewer & Wats. Bot. Cal. **1**: 178. 1876, not *P. nevadensis* Boiss.

TYPE LOCALITY: Little Belt Mountains, Montana.

RANGE: Alberta to Washington and California.

SPECIMENS EXAMINED: Klickitat County, *Suksdorf* in 1885.

This supposed species seems to me quite identical with the Old World *Potentilla rupestris* L.

3. Drymocallis convallaria Rydberg, Mon. N. A. Pot. 193. 1898.

Potentilla convallaria Rydberg, Bull. Torr. Club **24**: 249. 1897.

TYPE LOCALITY: Bozeman, Montana.

RANGE: Washington to Wyoming and Assiniboia.

SPECIMENS EXAMINED: Conconully, *Whited* 1312; Rattlesnake Mountains, *Cotton* 470; Loomis, *Elmer* 565; Pullman, *Piper* 1528; *Elmer* 820.

ZONAL DISTRIBUTION: Arid transition.

This species is very closely allied to the eastern *D. arguta*, to which it has often been referred.

4. Drymocallis valida (Greene).

Potentilla valida Greene, Pittonia **3**: 20. 1896.

Potentilla glutinosa Nutt.; Torr. & Gr. Fl. 1: 446. 1840, as synonym.
Drymocallis glutinosa Rydberg, Mon. N. A. Pot. 196. 1898.
Potentilla fissa major Torr. & Gr. Fl. 1: 446. 1840. not *P. verna major* Wahl.

TYPE LOCALITY: "In the vicinity of Victoria, Vancouver Island."

RANGE: British Columbia to Wyoming, Utah, and Oregon.

SPECIMENS EXAMINED: Olympic Mountains, *Flett* 110; Falcon Valley, *Suksdorf* 2211; Wenache, *Whited* 110; Clealum, *Whited* 415; Wenache Mountains, *Whited* 732; Spokane County, *Mrs. Tucker;* Pend Oreille River, *Lyall* in 1861; Loomis, *Elmer* 564; without locality, *Vasey* 317; Pullman, *Piper* 1528.

ZONAL DISTRIBUTION: Arid Transition.

5. **Drymocallis glandulosa** Rydberg, Mon. N. A. Pot. 198. 1898.
Potentilla glandulosa Lindl. Bot. Reg. **19**: *pl. 1583.* 1833.

TYPE LOCALITY: California.

RANGE: British Columbia and Alberta to New Mexico and California.

SPECIMENS EXAMINED: Glenwood, *Flett* 1335; Steilacoom, *Piper* 78; Wenache Mountains 1095; Blue Mountains, *Piper* 2444, 2446; Olympic Mountains, *Flett* 82.

ZONAL DISTRIBUTION: Arid Transition and Canadian.

Some of the above specimens have been referred to *D. reflexa* (Greene) Rydberg.

5a. **Drymocallis glandulosa incisa** (Lindl.) Rydberg, Mon. N. A. Pot. 199. 1898.
Potentilla glandulosa incisa Lindl. Bot. Reg. **23**: *pl. 1973.* 1837.

TYPE LOCALITY: California.

RANGE: Idaho and Washington to California.

SPECIMENS EXAMINED: Skamania County, *Suksdorf* 2307.

6. **Drymocallis glabrata** Rydberg, Mon. N. A. Pot. 201. 1898.

TYPE LOCALITY: Ellensburg, Washington. Collected by Elmer.

RANGE: Known only from the type locality.

SPECIMENS EXAMINED: Ellensburg, *Elmer* 412.

7. **Drymocallis wrangelliana** (Fisch. & Lall.) Rydberg, Mon. N. A. Pot. 201. 1898.
Potentilla wrangelliana Fisch. & Lall. Animad. Bot. Ind. Sem. Hort. Petrop. 7: 54. 1840.

TYPE LOCALITY: In the Russian colony of New California.

RANGE: Washington to California.

SPECIMENS EXAMINED: Clallam County, *Elmer* 2526; Olympic Mountains, *Piper* 2024, 2000; west Klickitat County, *Suksdorf* 1761; Manor, *Piper;* Bingen, *Suksdorf* 2209; Vancouver, *Piper* 4927.

ZONAL DISTRIBUTION: Transition and Hudsonian.

DRYAS.

1. **Dryas octopetala** L. Sp. Pl. 1: 501. 1753.

TYPE LOCALITY: "Habitat in alpibus Lapponicis, Helveticis, Austriacis, Sabaudicis, Hibernicis, Sibiricis."

RANGE: Alaska to Greenland, southward to Labrador and in the mountains, to Washington and Colorado.

SPECIMENS EXAMINED: Cascade Mountains, latitude 49°, *Lyall* in 1860; near Loomis, *Elmer* in 1897; Mount Rainier, *Flett* 2166.

ZONAL DISTRIBUTION: Arctic.

GEUM.

Segments of the leaves and their lobes acute........................ 1. *G. strictum.*
Segments of the leaves and their lobes obtuse.
  Flowers large; style glabrous................................ 2. *G. macrophyllum.*
  Flowers small; style puberulent.............................. 3. *G. oregonense.*

1. **Geum strictum** Soland.: Ait. Hort. Kew. 2: 217. 1789.

Type locality: "North America."

Range: British Columbia to Newfoundland, southward to Arizona, Missouri, and New Jersey.

Specimens examined: Along Tukanon River, *Lake & Hull* 516; nine miles southwest Pullman, *Piper*, July 9, 1901.

2. **Geum macrophyllum** Willd. Enum. 557. 1809.

Type locality: "Camtschatca."

Range: Alaska to California and Colorado, Siberia.

Specimens examined: Clallam County, *Elmer* 2524; Montesano, *Keller* 3947; Cascade Mountains, latitude 49°, *Lyall* in 1859: Silverton, *Bouck* 53; Falcon Valley, *Suksdorf* 288; Skokomish Valley, *Kincaid*, May, 1892; Beaver Creek, *Whited* 192; Rock Lake, *Lake & Hull* 515.

Zonal distribution: Transition.

This species is very close to if not identical with *Geum japonicum* Thunb.[a]

3. **Geum oregonense** Scheutz, Nov. Act. Soc. Sci. Upsala 7: 26. 1869.

Type locality: "Habit. in regione Oregonensi."

Range: Washington and Oregon to Montana.

Specimens examined: Ellensburg, *Whited* 528 (?); Spokane County, *Suksdorf* 289; *Mrs. Susan Tucker;* Harrington, *Sandberg & Leiberg* 219; Marshall Junction, *Piper*, July, 1896; without locality, *Vasey* in 1889; Clarks Springs, *Kreager* 39; Loon Lake, *Beattie & Chapman* 2083.

Zonal distribution: Arid Transition.

SIEVERSIA.

Flowers pale purplish; styles plumose.. 1. *S. ciliata.*
Flowers yellow; styles glabrous... 2. *S. rossii.*

1. **Sieversia ciliata** (Pursh).

Geum ciliatum Pursh, Fl. 1: 352. 1814.

Geum triflorum Pursh, Fl. 2: 736. 1814.

Type locality: "On the Kooskooskee." Collected by Lewis; the exact spot on the Quamash Flats, now Weippe, Idaho.

Range: British Columbia to Labrador, southward to Arizona, Missouri, and New York.

Specimens examined: Clallam County, *Elmer* 2529; Olympic Mountains, *J. M. Grant* in 1889; Whidby Island, *Gardner* 105; Klickitat River, *Flett* 1324; Wenache, *Whited* 126, 1163; Ellensburg, *Whited* 731; Spokane, *Dewart*, May 6, 1901; Hangman Creek, *Sandberg & Leiberg* 64; Pullman, *Hull* 517; *Piper* 1532; Clarks Springs, *Kreager* 22; Rattlesnake Mountains, *Cotton* 551.

Zonal distribution: Arid Transition.

Dr. E. L. Greene has proposed a new genus for this species and its immediate allies, Erythrocoma. A subspecies of *S. ciliata*, characterized by having the bractlets cut into filiform segment is designated *Erythrocoma ciliata ornata* Greene.[b]

2. **Sieversia rossii** R. Br. in Parry's 1st Voyage App. 276. 1824.

Geum rossii Ser. in DC. Prod. 2: 553. 1825.

Type locality: Melville Island.

Range: Arctic regions, south to Washington and Colorado.

Specimens examined: Mount Stuart, *Elmer* 245, 1182.

Dr. Greene has recently proposed a new genus Acomastylis with this species as its type. Elmer's number 1182 is considered a new species, *A. depressa* Greene.

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[a] Fl. Jap. 220. 1784.

[b] Leaflets 1: 178. 1906.

CERCOCARPUS.

1. **Cercocarpus ledifolius** Nutt.; Torr. & Gr. Fl. **1**: 427. 1840. MOUNTAIN MAHOGANY.

TYPE LOCALITY: Bear River, Idaho. Collected by Nuttall.

RANGE: Washington and Wyoming, southward to California and Arizona.

SPECIMENS EXAMINED: Near Salmon River, *Horner* 298; Blue Mountains, *Lake & Hull*, July, 1892; *Piper* 2449.

ZONAL DISTRIBUTION: Arid Transition.

KUNZIA.

1. **Kunzia tridentata** (Pursh) Spreng. Syst. **2**: 475. 1825. ANTELOPE BRUSH.

Purshia tridentata DC. Trans. Linn. Soc. **12**: 158. 1817.

Tigarea tridentata Pursh, Fl. **1**: 333. 1814.

TYPE LOCALITY: "In the prairies of the Rocky Mountains and on the Columbia River." Collected by Lewis.

RANGE: Washington to California, New Mexico, and Montana.

SPECIMENS EXAMINED: Wenache, *Whited* 77, 1064; Ellensburg, *Elmer* 384; *Piper*, May, 1897; North Yakima, *Flett* 1037; Pasco, *Hindshaw* 34; Clealum, *Henderson*, June, 1892; Hunts Junction, *Leckenby*, April, 1898; Crab and Wilson creeks, *Sandberg & Leiberg* 293; Moses Coulee, *Lake & Hull* 497; without locality, *Vasey* in 1889; Wenas, *Griffiths & Cotton* 97.

ZONAL DISTRIBUTION: Upper Sonoran.

MALACEAE. APPLE FAMILY.

Flowers racemose; carpels fleshy in fruit .... AMELANCHIER (p. 345)
Flowers corymbose.
    Carpels stony in fruit .... CRATAEGUS (p. 346).
    Carpels papery in fruit .... PYRUS (p. 347).

AMELANCHIER. SERVICEBERRY.

Twigs pale or ashy.
    Leaves cuneate at base .... 4. *A. cuneata*.
    Leaves rounded at base .... 2. *A. utahensis*.
Twigs not ashy.
    Leaves tomentose beneath when young, serrate only toward the apex. 1. *A. florida*.
    Leaves glabrous when young.
        Petals 2 cm. long; leaves bright green .... 3. *A. cusickii*.
        Petals 1 to 1.5 cm. long; leaves pallid .... 5. *A. basalticola*.

1. **Amelanchier florida** Lindl. Bot. Reg. **19**: *pl. 1589*. 1833.

Amelanchier ovalis semiintegrifolia Hook. Fl. Bor. Am. **1**: 202. 1834.

TYPE LOCALITY: "Northwest America." Collected by Douglas.

RANGE: British Columbia to California.

SPECIMENS EXAMINED: Montesano, *Heller* 3958; Lopez Island, *Lyall* in 1858; Fidalgo Island, *Flett* 1940; Cascade Mountains, latitude 49°, *Lyall* in 1859; Seattle, *Piper*, July 4, 1897; Olympia, *Henderson*, May 24, 1892; Rock Island, *Henderson*, July 3, 1892; Klickitat River, *Flett* 1325; Ellensburg, *Whited* 322; without locality, *Vasey* in 1889; Lake Chelan, *Lake & Hull*, August 25, 1892; Rock Creek, *Piper* 2831; Almota, *Hull* 499; Union Flat, *Piper*, April 29, 1897; *Henderson*, July 18, 1892; Pullman, *Piper* 1534; Clallam County, *Elmer* 2512; Nisqually Valley, *Allen* 214; Mount Adams, *Flett* 1325.

ZONAL DISTRIBUTION: Transition.

This is by far the most abundant species in Washington and it has commonly been referred to *A. alnifolia* Nutt. In Cooper's Report it was named *A. canadensis* var.

2. **Amelanchier utahensis** Koehne, Berlin Ostern. **32**: *fig. 2.* 1890.

Amelanchier alnifolia utahensis Jones, Proc. Cal. Acad. Sci. **5**: 679. 1895.

TYPE LOCALITY: Leeds, Utah.

RANGE: Washington to Utah.

SPECIMENS EXAMINED: Wenache, *Whited* 1028 in part; Rattlesnake Mountains, *Cotton* 569, 571, 365; Rock Creek, *Sandberg & Leiberg* 94.

ZONAL DISTRIBUTION: Upper Sonoran.

3. **Amelanchier cusickii** Fernald, Erythea **7**: 121. 1899.

TYPE LOCALITY: "On stony hillsides, Union County, Oregon." Collected by Cusick.

RANGE: Washington, Oregon, and Idaho.

SPECIMENS EXAMINED: Wenache, *Whited* 1028 in part, 1344; Fort Colville, *Lyall* in 1861; Rock Lake, *Piper* 2830; Spokane, *Piper* 2694; Union Flat, *Piper* 2732; *Elmer* 135; Wawawai, *Piper* 3812; Meyers Falls, *Beattie & Chapman* 2175.

ZONAL DISTRIBUTION: Arid Transition.

4. **Amelanchier cuneata** Piper, Bull. Torr. Club **27**: 392. 1900.

TYPE LOCALITY: Ellensburg, Washington.

SPECIMENS EXAMINED: Ellensburg, *Piper* 2713.

5. **Amelanchier basalticola** Piper, Fl. Palouse Reg. 100. 1901.

TYPE LOCALITY: Bluffs of Snake River, Whitman County, Washington, opposite Clarkston.

RANGE: Bluffs of Snake River in Washington and Idaho.

SPECIMENS EXAMINED: Wawawai Bluffs, *Piper* 3823; opposite Clarkston, *Hunter* 39.

ZONAL DISTRIBUTION: Arid Transition.

AMELANCHIER sp. Specimens collected by Heller (no. 3958) at Montesano and by Lamb (no. 1190) at Humptulips represent a species close to *A. florida*, but seemingly distinct. More and better material is needed.

CRATAEGUS. THORNAPPLE.

Fruit red; spines 4 to 6 cm. long.
  Calyx and fruit glabrous.. 1. *C. columbiana.*
  Calyx and fruit tomentose.. 2. *C. piperi.*
Fruit black; spines 2 to 3 cm. long.. 3. *C. brevispina.*

1. **Crataegus columbiana** Howell, Fl. N. W. Am. **1**: 163. 1898.

TYPE LOCALITY: "Common along the Columbia River and its tributaries east of the Cascade Mountains."

RANGE: Eastern Washington and eastern Oregon.

SPECIMENS EXAMINED: Wilson Creek, *Lake & Hull* 505; Spokane, *Piper* 2387; *Suksdorf* 919; Rock Creek, *Sandberg & Leiberg* 91; 6 miles south of Pullman, *Piper* 3809; Colville, *Kreager* 523.

ZONAL DISTRIBUTION: Arid Transition.

This species has been mistaken for the eastern *C. macracantha* Lodd. It also forms the basis for the entry "*C. tomentosa* L. var." in Suksdorf's list.

2. **Crataegus piperi** Britton, Torreya **1**: 55. 1901.

TYPE LOCALITY: Pullman, Washington.

RANGE: Eastern Washington, Idaho, and eastern Oregon.

SPECIMENS EXAMINED: Wenache, *Whited*, September 2, 1899; 1209, 1293; *Brandegee* in 1883; Pullman, *Piper* 1535; *Elmer* in 1896.

ZONAL DISTRIBUTION: Arid Transition and Upper Sonoran.

This may be only a subspecies of the former, with which it sometimes occurs, being indistinguishable except by the pubescence.

3. **Crataegus brevispina** (Dougl.) Heller, Cat. N. A. Pl. ed. 2. 98. 1900.
Crataegus douglasii Lindl. Bot. Reg. **21**: *pl. 1810.* 1835.
Crataegus punctata brevispina Dougl.; Hook. Fl. Bor. Am. **1**: 201. 1833.

Type locality: "Common on banks of streams on the north-west coast of America." Collected by Douglas and by Scouler.

Range: British Columbia to California and Nevada.

Specimens examined: Seattle, *Piper;* Peshastin, *Sandberg & Leiberg* 544; Wenache, *Whited* 1292, 1070, 89; Ellensburg, *Whited* 348; Glendale, *Lake & Hull* 504; without locality *Vasey* in 1889; Spokane, *Kreager* 534; Puyallup, *Piper,* May 29, 1902; Pullman, *Piper* 3827, 3826.

Zonal distribution: Arid Transition.

The specimens from western Washington are somewhat different from those of eastern Washington and possibly distinct.

Near Pullman and Spokane occurs a form whose fruit is first chestnut-colored, later turning black. This blooms a little later than the ordinary form, but has no definite characters to distinguish it.

PYRUS.

Leaves simple; fruit oblong.. 1. *P. diversifolia.*
Leaves pinnate; fruit globose.
  Fruit coral-red; leaflets shining, serrate from near the base........ 2. *P. sitchensis.*
  Fruit purple, glaucous; leaflets dull, serrate near the apex......... 3. *P. occidentalis.*

1. **Pyrus diversifolia** Bong. Mem. Acad. St. Petersb. VI. **2**: 133. 1832. Crabapple.
Pyrus rivularis Dougl.; Hook. Fl. Bor. Am. **1**: 203. 1834.

Type locality: Sitka.

Range: Alaska to California in the coast region.

Specimens examined: Clallam County, *Elmer* 2510; Cascade Mountains, latitude 49°, *Lyall;* Admiralty Head, *Piper,* May, 1898; Steilacoom, *G. C. Woolson;* Nisqually Valley, *Allen* 213; Manor, *Piper,* July 14, 1899; without locality, *Vasey* in 1889.

Zonal distribution: Humid Transition and Canadian.

2. **Pyrus sitchensis** (Roem.) Piper, Mazama **2**: 107. 1901. Mountain ash
Sorbus sitchensis Roem. Syn. Mon. **3**: 139. 1847.

Type locality: Sitka.

Range: Alaska to California and Idaho.

Specimens examined: Lake Cushman, *Piper* 1989; Twisp River, *Whited,* July 19, 1896; Easton, *Whited* 424; Mount Rainier, *Piper* 1990; Bear Prairie, *Allen* 291; Cascade Mountains, latitude 49°, *Lyall* in 1859; Klickitat River, *Flett* 1341; Nason Creek, *Sandberg & Leiberg* 683; near Lake Chelan, *Lake & Hull;* Blue Mountains, *Piper* 2420; Mount Carlton, *Kreager* 265; without locality, *Vasey* in 1889; Stehekin, *Griffiths & Cotton* 204.

Zonal distribution: Canadian and Hudsonian.

Referred to *Pyrus americana* DC. in Cooper's Report. It is also the *Sorbus sambucifolius* or *Pyrus sambucifolius* of various reports so far as Washington specimens are concerned, but it is quite different from the real *Pyrus sambucifolius* Cham. & Schlecht.

3. **Pyrus occidentalis** S. Wats. Proc. Am. Acad. **23**: 263. 1888. Mountain ash.
Sorbus occidentalis Greene, Fl. Fran. 54. 1891.

Type locality: Cascade Mountains, latitude 49°. Collected by Lyall.

Range: British Columbia to Oregon in the Cascade Mountains.

Specimens examined: Clallam County, *Elmer* 2509; Cascade Mountains, latitude 49°, *Lyall* in 1859; Baldy Peak, *Lamb* 1365, 1365a; Mount Rainier, *Piper* 1988, *Flett* 277; Goat Mountains, *Allen* 125; Mount Adams, *Henderson,* August, 1892; mountains, Skamania County, *Suksdorf,* August 13, 1886; near Skagit Pass, *Lake & Hull,* August, 1892; Stampede Pass, *Henderson,* October, 1892; Stevens Pass, *Sandberg & Leiberg* 750; Bridge Creek, *Elmer* 663; without locality, *Vasey* in 1889.

Zonal distribution: Hudsonian.

AMYGDALACEAE. ALMOND FAMILY.

Flowers perfect; carpel solitary .... PRUNUS.
Flowers dioecious; carpels five .... OSMARONIA.

PRUNUS.

Flowers racemose; fruit dark purple .... 1. *P. demissa*.
Flowers corymbose; fruit bright red .... 2. *P. emarginata*.

1. **Prunus demissa** (Nutt.) Dietrich, Syn. Pl. **3**: 43. 1843. CHOKECHERRY.

Cerasus demissa Nutt.; Torr. &. Gr. Fl. **1**: 411. 1840.

TYPE LOCALITY: "Plains of the Oregon toward the sea and mouth of the Wahlamet."

RANGE: Oregon, Washington, and Idaho. Perhaps also farther eastward.

SPECIMENS EXAMINED: Whidby Island, *Gardner* 100; Wenache, *Whited* 117, 1071; Yelm Prairie, *Piper* 1120; North Yakima, *Mrs. Steinweg* in 1894; Sunnyside, *Cotton* 371; Rock Lake, *Sandberg & Leiberg* 104; upper Columbia, *Lyall;* Lake Chelan, *Lake & Hull* in August, 1892; without locality, *Vasey* in 1889; Spokane Valley, *Watson* 97; Pullman, *Piper* 1530, August, 1896; Wawawai, *Lake*, May, 1892; Blue Mountains, *Piper*, August, 1896.

ZONAL DISTRIBUTION: Arid Transition and Upper Sonoran.

Two forms or perhaps distinct species occur in eastern Washington, one with densely flowered stiff racemes blooming about a week later than the other, which has looser, laxer racemes. The former is often arborescent, and tends to have broader leaves.

2. **Prunus emarginata** (Dougl.) Walp. Rep. **2**: 9. 1843. WILD CHERRY.

Cerasus emarginata Dougl.; Hook. Fl. Bor. Am. **1**: 169. 1830.

TYPE LOCALITY: "On the upper part of the Columbia River, especially about the Kettle Falls." Collected by Douglas.

RANGE: British Columbia to Idaho and California.

SPECIMENS EXAMINED: Klickitat River, *Flett* 1327; Wenache Mountains, *Whited* 1005; Peshastin, *Sandberg & Leiberg* 590; White Bluff, *Lake & Hull*, August, 1892; Ellensburg, *Piper*, May, 1897; without locality, *Vasey* in 1889; Blue Mountains, *Lake & Hull*, July, 1892; *Piper*, August, 1896; Mount Carlton, *Kreager* 245.

ZONAL DISTRIBUTION: Arid Transition.

2a. **Prunus emarginata villosa** Sudw. U. S. Dept. Agr. Div. Forest. Bull. **14**: 240. 1897.

Cerasus mollis Dougl.; Hook. Fl. Bor. Am. **1**: 169. 1830, not Torr. 1824.

Prunus mollis Walp. Repert. **2**: 9. 1843.

Prunus emarginata mollis Brewer in Brewer and Wats. Bot. Cal. **1**: 167. 1876.

TYPE LOCALITY: "Northwest coast of America, near the mouth of the Columbia, and on subalpine hills, near the sources of that river." Collected by Douglas.

RANGE: British Columbia to Oregon and Idaho.

SPECIMENS EXAMINED: Clallam County, *Elmer* 2525; Montesano, *Heller* 4036; Port Ludlow, *Binns;* Tacoma, *Flett* 56; Admiralty Head, *Piper*, May, 1898; upper Nisqually Valley, *Allen* 120; Cascade Mountains, latitude 49°, *Lyall;* Lake Chelan, *Lake & Hull* 513.

ZONAL DISTRIBUTION: Humid Transition.

OSMARONIA.

1. **Osmaronia cerasiformis** (Torr. & Gr.) Greene, Pittonia **2**: 191. 1891. INDIAN PLUM.

Nuttallia cerasiformis Torr. & Gr.; Hook & Arn. Bot. Beech. Voy. 337. *pl. 82*, 1841.

TYPE LOCALITY: "On the Columbia." Collected by Nuttall, by Douglas, and by Scouler.

RANGE: British Columbia to California in the coast region.

SPECIMENS EXAMINED: Montesano, *Heller* 3874; Admiralty Head, *Piper*, March, 1898; Seattle, *Piper* 61; upper Nisqually Valley, *Allen* 59; west Klickitat County, *Suksdorf* 13; Maxfield, *Henderson*, April, June, 1892; Clallam County, *Elmer* 2511.

Zonal distribution: Humid Transition.

Allen's 59 is considered a distinct subspecies by Professor Greene, *Osmaronia cerasiformis nigra*,[a] based principally upon the drupes which seem to lack the usual glaucous coating.

FABACEAE. Bean Family.

- Stamens 5, monadelphous; leaves pinnate .... Petalostemum (p. 350).
- Stamens 10.
  - Filaments distinct; leaves trifoliolate .... Thermopsis (p. 349).
  - Filaments united, either monadelphous or diadelphous, 9 and 1.
    - Anthers of two forms, round and oblong.
      - Leaves digitate with 5 to 11 leaflets; ours herbs... Lupinus (p. 350).
      - Leaves with solitary leaflets; spiny shrub......... Ulex (p. 358).
    - Anthers all alike.
      - Leaves digitate, or if pinnate then trifoliolate.
        - Pods curved or coiled; flowers in spikes....... Medicago (p. 363).
        - Pods straight.
          - Flowers in long racemes................. Melilotus (p. 358).
          - Flowers in heads or head-like umbels..... Trifolium (p. 358).
      - Leaves pinnate; leaflets mostly more than 3; no tendrils.
        - Herbage dotted with conspicuous glands.
          - Leaflets 3; pods not spiny............... Psoralea (p. 363).
          - Leaflets many; pods spiny............... Glycyrrhiza (p. 364).
        - Herbage not dotted with conspicuous glands.
          - Leaves unequally pinnate, not tendril bearing.
            - Flowers umbellate or solitary; pods linear .... Hosackia (p. 364).
            - Flowers spicate or racemose, rarely solitary, then pods not linear.
              - Pod a loment.................. Hedysarum (p. 366).
              - Pod not a loment.
                - Keel of the corolla acute or subulate at apex......... Aragallus (p. 367).
                - Keel of the corolla obtuse at apex.................... Phaca (p. 367).
          - Leaves abruptly pinnate, usually tendril-bearing.
            - Style filiform, hairy only near the tip.. Vicia (p. 374).
            - Style flattened, hairy on the inner side. Lathyrus (p. 375).

THERMOPSIS.

1. **Thermopsis montana** Nutt.; Torr. & Gr. Fl. 1: 388. 1840.

Type locality: "High valleys of the Rocky Mountains, in bushy places by streams, near the line of Upper California." Collected by Nuttall.

Range: Washington to Montana and Arizona.

Specimens examined: Walla Walla region, *Brandegee* 695.

This or the following was referred to *T. fabacea* (Pall.) DC. by Hooker.[b]

1a. **Thermopsis montana ovata** Robinson, subsp. nov.

Leaflets broader than in *T. montana*, ovate.

Range: North Idaho and adjacent Washington and Oregon.

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[a] Greene, Pittonia 5: 309. 1905.

[b] Fl. Bor. Am. 1: 128. 1838.

Specimens examined: Chehalis County, *Lamb* 1197; Walla Walla, *Leckenby*, June, 1898; Blue Mountains, *Piper*, July, 1896; Palouse City, *Moore*, June, 1893; *Henderson*, July, 1892.

Zonal distribution: Arid Transition.

The type is *Piper* 1489, collected on Cedar Mountain, Latah County, Idaho.

PETALOSTEMUM.

1. **Petalostemum ornatum** Dougl.; Hook. Fl. Bor. Am. 1: 138. 1830.

Type locality: "Frequent in the arid prairies near the Blue Mountains of Lewis [Snake] River, North-West America." Collected by Douglas.

Range: Eastern Washington, eastern Oregon, and south Idaho.

Specimens examined: Pasco, *Piper* 2973; *Leckenby* in June, '898; Walla Walla, *Lyall* in 1860; near Columbia and Snake rivers, *Brandegee* 714.

Zonal distribution: Upper Sonoran.

LUPINUS. Lupine.

Subgen. I. PLATYCARPOS S. Wats.—Ovary 2-ovuled, forming a short and relatively broad 2-(1-)seeded pod; annuals or biennials with deep often lignescent taproot and persisting cotyledons.

Peduncles 1 to 2 cm. long; flowers small; corolla about 1 cm. long.... 1. *L. pusillus.*

Peduncles 5 to 15 cm. long; flowers larger; corolla 1.5 cm. long...... 2. *L. microcarpus.*

Subgen. II. LUPINUS proper.—Ovary 3 to many-ovuled, forming an oblong to linear several-seeded pod; cotyledons not persisting.[a]

§ 1. Micranthii.—Annuals, slender, branching from the base; leaflets glabrous on the upper surface.

Flowers subsessile; wings oblong, 6 mm. in length; corolla usually pale purple.. 3. *L. micranthus.*

Pedicels 4 mm. long; corolla deep blue; wings 8 mm. long........... 4. *L. bicolor.*

§ 2. Sericei.—Perennials; calyx subsymmetrical at the base; corolla blue, varying to white or roseate; keel usually ciliate; leaflets appressed-pubescent and silky (rarely tomentose) on both surfaces, canescent.

Stems scapose or subscapose, 7 to 25 (rarely 40) cm. high; leaves chiefly basal; flowers sessile or on very short pedicels.

  Very dwarf (7 to 15, rarely 20, cm. high), cespitose; flowers subsessile, small; keel 6 to 8 mm. long.

    Leaflets 5 to 8, very small, 6 to 10 mm. long.................. 5. *L. lyallii.*

    Leaflets 7 to 12, at least 12 to 20 mm. long.

      Densely and somewhat shaggy sericeous-pubescent; vexillum obovate-oblong.. 6. *L. aridus.*

      Covered with a fine and closely appressed sericeous pubescence; vexillum suborbicular.................................. 7. *L. minimus.*

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[a] The following key will aid in locating a species in its proper section:

Annuals, branching from the base; flowers small......................... 1. Micranthii.

Perennials.

  Calyx saccate or spurred at the base.................................. 6. Calcarati.

  Calyx symmetrical or nearly so at base.

    Flowers yellow.. 5. Sulphurei.

    Flowers purple or violet.

      Leaves green, the pubescence thin, never silky or villous..... 4. Rivulares.

      Leaves sericeous or villous.

        Pubescence sericeous.. 5. Sericei.

        Pubescence villous.. 6. Saxosi.

Commonly 20 to 30 (rarely 40) cm. high; flowers somewhat larger; keel 9 to 11 mm. long.

Pods 15 mm. long; flowers subsessile .... 8. *L. lepidus.*

Pods 20 to 25 mm. long; pedicels about 3 mm. long.

Keel ciliate.. 9. *L. piperi.*

Keel not ciliate.................................... 9a. *L. piperi imberbis.*

Stems leafy.

Plants dwarf, scarcely 20 cm. high, somewhat cespitose; pedicels slender, in anthesis 4 to 8 mm. long .... 10. *L. subsericeus.*

Plants not dwarf.

Decumbent or procumbent; maritime species .... 18. *L. littoralis.*

Erect, tall, 4 to 12 cm. high, not maritime.

Keel narrow, bent almost at right angles, early exposed for much of its length; pubescence of stem and leaves inclining to velvety rather than silky .... 11. *L. albicaulis.*

Keel broader, only moderately falcate, the tip only exserted.

Flowers subsessile in dense spiciform racemes.

Stout: silky pubescence somewhat coarse, shaggy and inclining to spread.

Bracts scarcely exceeding the buds .... 12. *L. leucophyllus.*

Bracts linear-filiform, plumose, much longer than the buds .... 12a. *L. leucophyllus plumosus.*

Slender; silky pubescence very fine and closely appressed.

Leaflets oblanceolate, acute or acuminate .... 13. *L. canescens.*

Leaflets elliptic-oblanceolate, rounded and mucronate at the apex .... 13a. *L. canescens amblyophyllus.*

Pedicels well developed; racemes relatives loose.

Standard glabrous .... 14. *L. suksdorfii.*

Standard more or less pubescent dorsally.

Pubescence of the stem loose and spreading........ 15. *L. sericeus.*

Pubescence of the stem appressed.

Stem stout, usually solitary, branching freely; caudex not much thickened.

Bracts scarcely or not at all surpassing the larger buds............................. 16. *L. ornatus.*

Bracts much exceeding the larger buds........ 16a. *L. ornatus bracteatus.*

Stems several, slender, subsimple from a thickish caudex .... 17. *L. alpicola.*

§ 3. SAXOSI.—Perennials; leaflets green on both surfaces, glabrous or villous above, villous beneath; hairs long and loose, not so numerous or closely appressed as to give a silky luster; calyx subsymmetrical at the base; corolla blue or purple varying to white.

Dwarf, 20 to 30 cm. high; keel distinctly ciliate.

Flowers small, few, in loose racemes; petals less than 1 cm. long. 19. *L. volcanicus.*

Flowers larger, numerous, in a rather dense raceme; petals 1.5 cm. long .... 20. *L. saxosus.*

Taller, 30 to 90 cm. high; keel naked or only obsoletely ciliate.
  Leaflets obtuse or rounded at the apex, about 4 cm. long, loosely hairy on both surfaces .... 21. *L. subalpinus.*
  Leaflets oblanceolate, acute, 5 to 6 cm. long, glabrous or nearly so on the upper surface .... 22. *L. wyethii.*

§ 4. Rivulares.—Leaflets green and glabrous (or obscurely puberulent) above, glabrous or minutely appressed-pubescent beneath; corolla blue or purple, varying to roseate or white; calyx subsymmetrical at the base.

Leaflets of the lower leaves 10 to 16, very large, 6 to 14 cm. long, 1.7 to 3.6 cm. wide .... 23. *L. polyphyllus.*
Leaflets 6 to 9 in number, 4 to 9 cm. long, 5 to 15 mm. broad.
  Bracts long, spreading-villous, usually persisting in anthesis; stems simple .... 24. *L. burkei.*
  Bracts subulate, minutely appressed-pubescent and canescent, usually caducous; stems branched .... 25. *L. rivularis.*

§ 5. Sulphurei.—Perennials, leafy-stemmed; corolla yellow; calyx subsymmetrical at the base.

Flowers large; petals about 16 mm. long, deep yellow .... 26. *L. sabinii.*
Flowers smaller; petals about 1 cm. long, light yellow .... 27. *L. sulphureus.*

§ 6. Calcarati.—Perennials, leafy-stemmed, erect, not maritime; calyx strongly saccate or shortly spurred at the base.

Corolla blue .... 28. *L. laxiflorus.*
Corolla pale yellow .... 28a. *L. laxiflorus theiochrous.*

1. Lupinus pusillus Pursh, Fl. **2**: 468. 1814.

Type locality: "On the banks of the Missouri." Collected by Lewis.

Range: Washington to Dakota, southward to Arizona, and New Mexico.

Specimens examined: Pasco, *Piper* 2982, July 11, 1897; *Hindshaw* 39; Mabton, *Cotton* 1115.

Zonal distribution: Upper Sonoran.

2. Lupinus microcarpus Sims, Bot. Mag. **50**: *pl. 2413.* 1823.

Type locality: Chile.

Range: Washington to California. Chile.

Specimens examined: Coupeville, *Gardner* 88; Ellensburg, *Piper*, July 9, 1897; *Whited* 536; *Elmer* 371; North Yakima, *Henderson*, October 5, 1892; *Watt*, August, 1895; *Mrs. Steinweg* in 1894; without locality, *Vasey* 259; Prosser, *Cotton* 912; Wenas, *Griffiths & Cotton* 85.

Zonal distribution: Upper Sonoran.

3. Lupinus micranthus Dougl.; Lindl. Bot. Reg. **15**: *pl. 1251.* 1829.

Type locality: "Upon the gravelly banks of the southern tributaries of the Columbia and on barren ground in the interior of California." Collected by Douglas.

Range: British Columbia to California.

Specimens examined: Whidby Island, *Gardner*, July, 1898; Tacoma, *Flett* 194, May 20, 1895; *Leckenby*, May, 1898; Olympia, *Kincaid*, July, 1896; Johns Island, *Lawrence* 185; Nisqually, *Wilkes Expedition*, 118.

Zonal distribution: Humid Transition.

4. Lupinus bicolor Lindl. Bot. Reg. **13**: *pl. 1109.* 1827.

Type locality. "In the interior of the country about the Columbia River, from Fort Vancouver to the branches of Lewis and Clarke's River, always on dry gravelly soil under the shade of trees in the open plains." Collected by Douglas.

We suspect strongly that there is some error about the type locality. The species seems to be common in California and extends into Oregon, but no specimens from Washington have been seen.

5. **Lupinus lyallii** A. Gray, Proc. Am. Acad. 7: 334. 1868.

TYPE LOCALITY: "Summit of the Cascade Mountains, latitude 49°." Collected by Lyall.

RANGE: Cascade Mountains, British Columbia to Oregon.

SPECIMENS EXAMINED: Mount Rainier, *Piper* 2092; *Allen* 100; Mount Adams, *Henderson*, August 9, 1892; *Flett* 1257; *Cotton* 1516; Cascade Mountains, 49°, *Lyall.*

ZONAL DISTRIBUTION: Arctic.

6. **Lupinus aridus** Dougl.; Lindl. Bot. Reg. **15**: *pl. 1242.* 1829.

TYPE LOCALITY: "Same range of country as *Lupinus leucophyllus* and equally common." Collected by Douglas.

RANGE: Washington and Oregon.

SPECIMENS EXAMINED: Mason County, *Kincaid*, June 15, 1892; Olympia, *Kincaid*, July 14, 1896; Woodlawn, *Henderson*, June 22, 1892; Glenwood, *Flett* 1258; Pasco, *Henderson*, June, 1892; North Yakima, *Henderson*, May 2, 1892; Ellensburg, *Hindshaw*, May, 1896.

ZONAL DISTRIBUTION: Transition.

7. **Lupinus minimus** Dougl.; Hook. Fl. Bor. Am. **1**: 163. 1830.

TYPE LOCALITY: "Mountain valleys in Northwest America near Kettle Falls; and very abundant towards the Rocky Mountains along the course of the Columbia." Collected by Douglas.

RANGE: British Columbia and Idaho to Oregon.

This species has not recently been collected in the State.

8. **Lupinus lepidus** Dougl.; Lindl. Bot. Reg. **14**: *pl. 1149.* 1828.

TYPE LOCALITY: "From Fort Vancouver to the Great Falls of the Columbia." Collected by Douglas.

RANGE: Vancouver Island to Oregon.

SPECIMENS EXAMINED: Clallam County, *Elmer* 2541; Thurston County, *Heller* 4048; Olympia, *Kincaid*, July 4, 1896; Tacoma, *Flett* 898, 195; Woodlawn, *Henderson*, June 2, 1892; Fourth Plain, *Piper* 3072; North Yakima *Henderson*, May 29, 1892; Vancouver, *Piper* 4923.

ZONAL DISTRIBUTION: Humid Transition.

9. **Lupinus piperi** Robinson, sp. nov. (§ SERICEI).

Silky and canescent, leafy at the base; root single, perpendicular; stems 1 to 6, scapose, rather stout, simple, erect, curved-ascending, or decumbent, covered with a loosely appressed pubescence; leaflets 5 to 8, oblanceolate, acute, or acutish, about 3 cm. long; petioles 5 to 10 cm. long; peduncles 7 to 13 cm. in length, equaling the showy rather loose racemes; pedicels 3 to 4 mm. long, tomentose with widely spreading hairs; corolla deep blue; the standard broad, entirely glabrous, paler toward the center; keel ciliated; pods 20 to 24 mm. long, 4 or 5-seeded. This species is near *L. hellerae* Heller, but is paler in color and has shorter leaflets, spreading pubescence on the pedicels, glabrous standard, etc. Found in gravelly soil.

SPECIMENS EXAMINED: Spokane, *Henderson*, June 2, 1892, 2338 in part; *Sandberg & Leiberg*, May, 1893; *Piper* 2730 (type), 2949, 2287; Spangle, *Piper* 2440, 3543.

ZONAL DISTRIBUTION: Arid Transition.

9a. **Lupinus piperi imberbis** Robinson, subsp. nov.

Keel not ciliated; leaflets larger, 3.6 cm. long; pedicels 6 mm. in length; pubescence of the stems and petioles widely spreading.

SPECIMENS EXAMINED: Wenache, *K. Whited*, no. 121, June, 1896, type.

10. Lupinus subsericeus Robinson, sp. nov. (§ Sericei).

Root stout, bearing a well-developed leafy crown; stems 15 to 25 cm. high, decumbent or curved-ascending, 2 or 3-leaved; petioles of the radical leaves slender, 7 to 10 cm. long; leaflets oblanceolate, obtusish, finely sericeous, but green on both surfaces, 16 to 24 mm. long, 3 to 6 mm. broad; peduncles short, 2 to 5 cm. in length; bracts lanceolate, rather promptly deciduous; racemes at length 10 to 13 cm. long, becoming rather loose; bractlets unusually large, oblong, 4 mm. in length; flowers 12 to 14 mm. long, on slender pedicels 4 to 6 mm. in length; upper calyx lobe cleft four-fifths of the way to the base, the lower distinctly and sharply 3-toothed; corolla indigo-blue with a spot of lighter color on the glabrous obovate standard; keel ciliated; ovules about 5; pod densely sericeous.

Specimens examined: Ellensburg, *Whited* 602, May 5, 1898; Badger Mountain, *Whited* 1220.

11. Lupinus albicaulis Dougl.; Hook. Fl. Bor. Am. **1**: 165. 1830.

Type locality: "About Fort Vancouver on the Columbia."

Range: Washington and Oregon in the coast region.

Specimens examined: Whidby Island, *Gardner* 427; near Olympia, *Heller* 4039; McAllisters Lake, *Henderson*, June, 1892; Fourth Plain, *Piper*, July 14, 1899; Union City, *Piper*, July 20, 1890.

Specimens collecetd by *Suksdorf* in Falcon Valley, nos. 345, 346, are closely allied to *L. albicaulis*, but probably represent a new species.

Zonal distribution: Humid Transition.

12. Lupinus leucophyllus Dougl.; Lindl. Bot. Reg. **13**: *pl. 1124*. 1827.

Type locality: "From the Great Falls of the Columbia in North America to the sources of the Missouri among the Rocky Mountains."

Range: Washington to Nevada and New Mexico.

Specimens examined: Ellensburg, *Whited* 551; upper Wenas River, *Henderson* 2336; Rock Lake, *Lake & Hull* 432; Spokane, *Piper* 1901, 2270; *Dewart* in 1900; *Henderson* 2335; Pullman, *Piper*, July, 1893; July 28, 1894, and 1902; *Hull* 755; Waitsburg, *Horner* 86; Blue Mountains, *Piper*, July 15, 1896; Conconully Creek, *Griffiths & Cotton* 286; Colville Reservation, *Griffiths & Cotton* 398.

Zonal distribution: Arid Transition.

12a. Lupinus leucophyllus plumosus (Dougl.) Robinson.

Lupinus plumosus Dougl. Bot. Reg. **15**: *pl. 1217;* Hook. Fl. Bor. Am. **1**: 165.

Bracts very long and narrow, plumose-ciliate, much exceeding the buds. Sometimes well marked, but in other cases vague and confluent with the typical form.

Type locality: "Common in northern California in 45° north, growing in gravelly soil; it is also found at the sources of the Wallawallah River, near the Blue Mountains." Collected by Douglas.

Specimens referable to this are included in the preceding.

13. Lupinus canescens Howell, Erythea **1**: 110. 1893.

Type locality: "At the western base of Buck's Mountain, a spur of the Blue Mountains of Oregon."

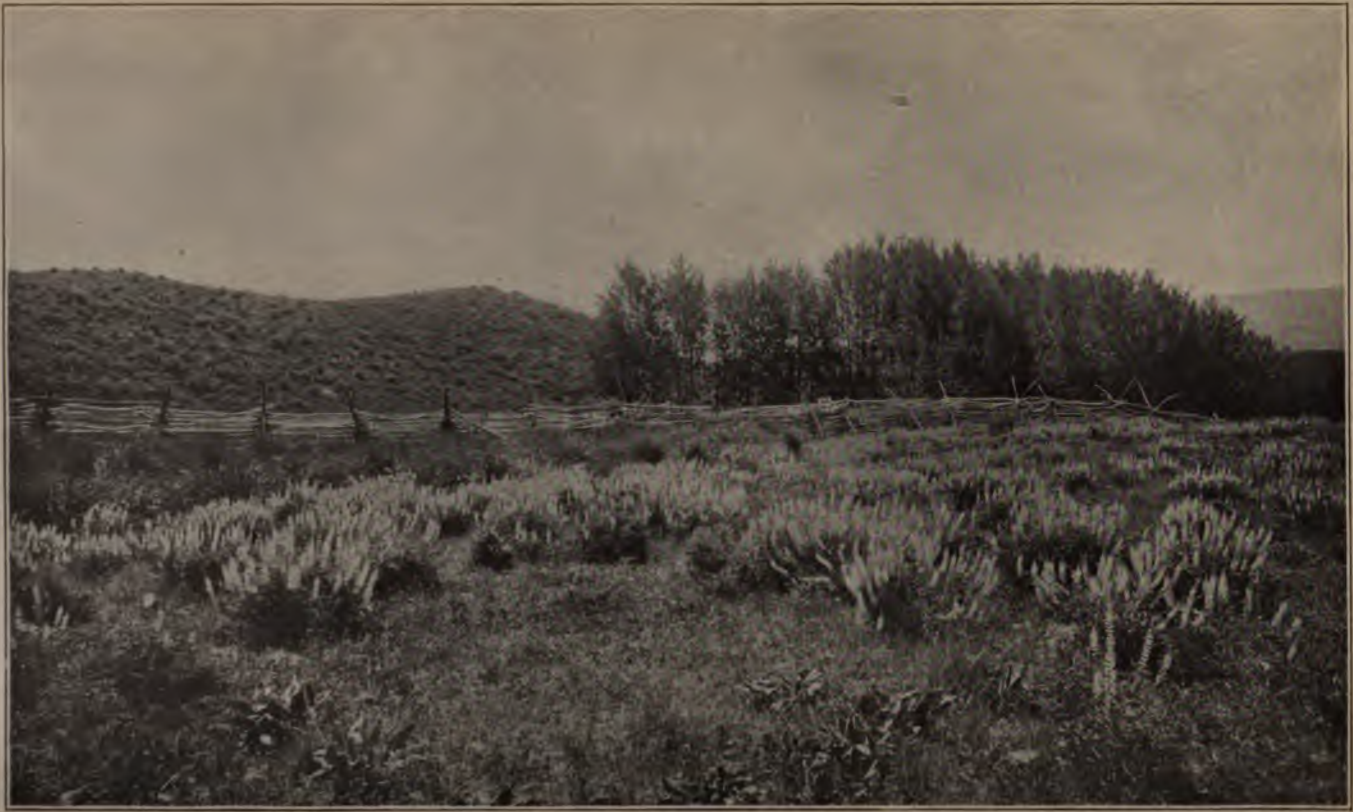
Range: Washington and Oregon.

Specimens examined: Klickitat Valley, *J. Howell*, June, 1879.

13a. Lupinus canescens amblyophyllus Robinson, subsp. nov.

Leaflets elliptic-lanceolate, broader than in the typical form, rounded and mucronulate at the apex; seeds red.

Specimens examined: Near Egbert Springs, Douglas County, Washington, *Sandberg & Leiberg* 402 (type), July 5, 1893.



LUPINUS ORNATUS IN LOW MEADOWS NEAR WENAS.

23. Lupinus polyphyllus Lindl. Bot. Reg. **13**: *pl. 1096*. 1827.

Type locality: "In the North-West of North America."

Range: British Columbia to California.

Specimens examined: Montesano, *Heller* 3878; Whatcom County, *Gardner*; Seattle, *Piper*, July, 1897; Woodlawn, *Henderson*, June 22, 1892; Maxfield, *Henderson*, June 22, 1892; Manor, *Piper*, July 14, 1899; Fourth Plain, *Piper*, July 14, 1899; Vancouver, *Piper* 4925.

Zonal distribution: Transition.

24. Lupinus burkei S. Wats. Proc. Am. Acad. **8**: 525. 1873.

Type locality: "Snake Country." Collected by Burke.

Range: Washington, Oregon, and Idaho.

Specimens examined: Spangle, *Piper* 2875, 3548; Silver Lake, *Henderson*, July, 1892; Rock Lake, *Sandberg & Leiberg*, May, 1893; Cheney, *Sandberg & Leiberg*, May, 1893; Spokane County, *Mrs. Tucker* 16; without locality, *Vasey* 265.

The following specimens are not typical, but for the present are referred here: Mount Stuart, *Elmer* 1112; Wenache Mountains, *Elmer* 454; Peshastin, *Sandberg & Leiberg*, July, 1893.

Zonal distribution: Arid Transition.

25. Lupinus rivularis Dougl. Bot. Reg. **19**: *pl. 1595*. 1833

Type locality: "Native of California."

Range: British Columbia to California.

Specimens examined: Vancouver, *Piper* 4924; Clallam County, *Elmer* 2542; Orchard Point, *Piper* 2315; Montesano, *Heller* 3906; Hoodsport, *Henderson* 1875; Chehalis County, *Lamb* 1181; Kittitas County, *Henderson*, June 11, 1892; Falcon Valley, *Suksdorf* 2566; west Klickitat County, *Suksdorf* 2563; Moss Creek, *Suksdorf* 2565, 2564; Tacoma, *Flett* 112; *Leckenby*, June 10, 1898; Charleston, *Piper*, July 2, 1895; without locality, *Vasey* in 1889.

Zonal distribution: Humid Transition.

26. Lupinus sabinii Dougl.; Hook. Fl. Bor. Am. **1**: 166. 1830.

Type locality: "On the Blue Mountains of North America, and on the dividing ridge of the Rocky Mountains near the confines of perpetual snow." Collected by Douglas.

Range: Blue Mountains of Washington and probably of Oregon.

Specimens examined: Mountains near Waitsburg, *Piper* 2331, *Horner* 91; near the same place, *Cusick* 3011.

Zonal distribution: Arid Transition.

These specimens have somewhat smaller flowers than Douglas' originals, and differ slightly in pubescence.

27. Lupinus sulphureus Dougl.; Hook. Fl. Bor. Am. **1**: 166. 1830.

Type locality: "On the Blue Mountains of North West America and on elevated grounds near the sources of Clarke's River." Collected by Douglas.

Range: Washington, Oregon, and Idaho.

Specimens examined: Blue Mountains, Columbia County, *Piper* 2332; *Horner* 87, 88.

Zonal distribution: Hudsonian or Canadian.

28. Lupinus laxiflorus Dougl. Bot. Reg. **14**: *pl. 1140*. 1828.

Lupinus arbustus Dougl. Bot. Reg. **15**: *pl. 1230*. 1829.

Type locality: "In dry, open, gravelly plains about the great rapids of the River Columbia." Collected by Douglas.

Range: British Columbia to Oregon and Idaho.

Specimens examined: Wenache Region, *Brandegee* 703; North Yakima, *Henderson* 2337; Ellensburg, *Piper* 2727; Falcon Valley, *Suksdorf* 2569; Columbus, *Suksdorf* 1792;

For illustration of *Lupinus rivularis*, see Plate X, facing page 43.

Chenowith, *Suksdorf* 2568; without locality, *Vasey* 264; Blue Mountains, *Horner* 277; *Piper* 2329; Wenache Mountains, *Cotton* 1301; Hell Roaring River, *Cotton* 1519; Wenache, *Whited* 96, 41, 3, 104, and June 28, 1896; near Wenache, *Whited* 120; Wenache, *Whited* 1105.

ZONAL DISTRIBUTION: Arid Transition.

28a. Lupinus laxiflorus, forma **theiochrous** Robinson, forma nov.

Corolla sulphur-yellow.

SPECIMENS EXAMINED: Near top of ridge, northern slope of Rattlesnake Mountains, Yakima County, Washington, *J. S. Cotton*, July 16, 1900.

LUPINUS HOLOSERICEUS Nutt, LUPINUS ARGENTEUS Pursh, LUPINUS PARVIFLORUS Nutt. These three names are included in Suksdorf's list, but we have been unable to find good evidence that the species occur in the State.

ULEX.

1. Ulex europaeus L. Sp. Pl. **2**: 741. 1753. GORSE. FURZE.

TYPE LOCALITY: "Habitat in Anglia, Gallia, Brabantia."

This plant is well established on Alki Point near Seattle, and has also been reported from other localities.

MELILOTUS.

Flowers white .... 1. *M. albus.*
Flowers yellow .... 2. *M. officinalis.*

1. Melilotus albus Desr. in Lam. Encyc. **4**: 63. 1797. SWEET CLOVER.

TYPE LOCALITY: Siberia.

SPECIMENS EXAMINED: North Yakima, *Watt*, August, 1895; Egbert Springs, *Sandberg & Leiberg* 398.

2. Melilotus officinalis (L.) Lam. Fl. Fr. **2**: 594. 1778. YELLOW MELILOT.

Trifolium melilotus officinalis L. Sp. Pl. **2**: 765. 1753.

TYPE LOCALITY: Europe.

SPECIMENS EXAMINED: Okanogan, *Griffiths & Cotton* 345.

TRIFOLIUM. CLOVER.

- Leaflets 5 to 7; flowers large, 2 to 3 cm. long .... 1. *T. macrocephalum.*
- Leaflets 3; flowers smaller.
  - Heads not subtended by an involucre.
    - Perennials; with thick roots or creeping rootstocks.
      - Heads on axillary peduncles; introduced.
        - Flowers white; stems creeping .... 10. *T. repens.*
        - Flowers pink; stems procumbent .... 11. *T. hybridum.*
      - Heads on terminal peduncles; native.
        - Leaves glabrous; corolla red .... 2. *T. douglasii.*
        - Leaves pubescent.
          - Calyx-teeth plumose.
            - Heads ovoid, becoming oblong .... 3. *T. plumosum.*
            - Heads globose.
              - Lobes of the calyx subequal, 3 to 4 times as long as the tube .... 4. *T. eriocephalum.*
              - Lobes of the calyx unequal, the anterior twice as long as the calyx tube and the other lobes .... 5. *T. arcuatum.*

Calyx teeth hairy, not plumose.
Flowers red; stipules aristate.......... 9. *T. pratense.*
Flowers whitish; stipules not aristate.
Flowers pedicelled; heads globose . 6. *T. latifolium.*
Flowers subsessile.
Heads obovate; corollas not inflated; leaflets soft; stipules acuminate........... 7. *T. longipes.*
Heads globose; corollas inflated; leaflets firm; stipules obtusish............. 8. *T. covillei.*
Annuals; roots fibrous.
Calyx teeth plumose.
Heads ovate; flowers dark purple.............. 12. *T. albopurpureum*
Heads oblong; flowers pink..................... 13. *T. arvense.*
Calyx teeth not plumose.
Corollas whitish, not becoming papery.
Teeth of the calyx scarious-margined and ciliate.................................. 14. *T. ciliolatum.*
Teeth of the calyx not scarious-margined nor ciliate.
Leaflets not notched at apex.......... 15. *T. gracilentum.*
Leaflets notched at apex.............. 16. *T. hallii.*
Corollas yellow, becoming papery in age.
Heads 20 to 40-flowered; standard distinctly striate.................................. 17. *T. procumbens.*
Heads 3 to 15-flowered; standard faintly striate................................ 18. *T. dubium.*
Heads subtended by an involucre.
Corolla becoming conspicuously inflated, yellowish....... 19. *T. flavulum.*
Corolla not becoming inflated.
Involucre deeply cleft, the lobes laciniately toothed; flowers dark purple.
Perennial with creeping rootstocks............. 20. *T. fimbriatum.*
Annuals.
Stems erect; calyx-lobes often 3-toothed; leaflets linear.......................... 21. *T. tridentatum.*
Stems decumbent; calyx-lobes usually entire.
Leaflets linear....................... 22. *T. oliganthum.*
Leaflets obovate or obcordate.......... 23. *T. variegatum.*
Involucre not deeply cleft, its lobes serrate or entire; flowers white or pale pink; annuals.
Glabrous; calyx teeth slender and branched..... 24. *T. cyathiferum.*
Villous; calyx teeth scarious-margined.
Involucre nearly inclosing the head........ 25. *T. microdon.*
Involucre merely basal.................... 26. *T. microcephalum.*

1. **Trifolium macrocephalum** (Pursh) Poir. Encyc. Suppl. **5**: 336. 1817.
Lupinaster macrocepalus Pursh, Fl. **2**: 479. 1814.
Trifolium megacephalum Nutt. Gen. **2**: 105. 1818.

TYPE LOCALITY: "Headwaters of the Missouri." Collected by Lewis. The specimens were really collected, however, at "Rock Fort Camp," the Dalles of the Columbia.

RANGE. Eastern Washington, eastern Oregon, and Idaho.

Specimens examined: Wenache Mountains, *Whited* 1355, 11: North Yakima, *Mrs. Steinweg* in 1894; Klickitat County, *Howell* 126; Cleman Mountain, *Henderson* in 1892; near Mount Adams, *Flett* 1259; "Ketetas" Valley, *Lyall* in 1860; Blue Mountains near source of Walla Walla River, *Douglas* in 1826; without locality, *Vasey* in 1889; Klickitat Hills, *Gorman*, April, 1895; Kittitas County, *Cotton* 1606.

Zonal distribution: Upper Sonoran.

2. **Trifolium douglasii** House, Bot. Gaz. **41**: 335. 1906.

Trifolium altissimum Dougl.; Hook. Fl. Bor. Am. **1**: 130. 1830, not Loisel. Fl. Gall. **2**: 479, 1807.

Type locality: "Between the Spokane River and Kettle Falls of the Columbia." Collected by Douglas.

Range: North Idaho and adjacent Washington and Oregon.

Specimens examined: "E' of W. Walla," *Nuttall*; Spokane County, *Suksdorf*; Spokane, *Henderson*, June, 1892; Pullman, *Piper* 1485; *Hull* 436; without locality, *Geyer* 472.

Zonal distribution: Arid Transition.

3. **Trifolium plumosum** Dougl.; Hook. Fl. Bor. Am. **1**: 130. 1830.

Type locality: "Blue Mts. in North-West America in alluvial soils." Collected by Douglas.

Range: Western Idaho, northeastern Oregon, and doubtfully southeastern Washington.

Specimens examined: Columbia River, *Douglas* in 1830 (a Washington locality?).

Zonal distribution: Canadian.

4. **Trifolium eriocephalum** Nutt.; Torr. & Gr. Fl. **1**: 313. 1838.

Type locality: "Prairies of the Wahlamet and near Fort Vancouver." Collected by Nuttall.

Range: Washington to California in the coast region.

Specimens examined: Fort Vancouver, *Nuttall*.

Zonal distribution: Humid Transition.

5. **Trifolium arcuatum** Piper, Bull. Torr. Club **28**: 39. 1901.

Type locality: Simcoe Mountains, Washington. Collected by Suksdorf.

Range: Washington and Oregon east of the Cascade Mountains.

Specimens examined: Simcoe Mountains, *Suksdorf* 270.

Zonal distribution: Arid Transition.

6. **Trifolium latifolium** (Hook.) Greene, Pittonia **3**: 223. 1897.

Trifolium longipes latifolium Hook. Lond. Journ. Bot. **6**: 209. 1847.

Type locality: "Open pine woods on the undulating ridges of the Coeur d'Alene Mountains, near St. Josephs." Idaho. Collected by Geyer.

Range: Washington, Idaho, and Oregon.

Specimens examined: Upper Naches River, *Henderson*, June, 1892; Mount Adams, *Henderson*, August, 1892; Lake Keechelus, *Henderson*, July, 1892; Clealum, *Henderson*, June, 1892; Wenache Mountains, *Elmer* 437; Peshastin, *Sandberg & Leiberg* 527; Spokane County, *Suksdorf* 919, 918; Spokane Valley, *Lyall* in 1861.

Zonal distribution: Canadian.

7. **Trifolium longipes** Nutt.; Torr. & Gr. Fl. **1**: 314. 1838.

Trifolium caurinum Piper, Erythea **6**: 29. 1898.

Type locality: "Valleys of the central chain of the Rocky Mountains and on the moist plains of the Oregon as low as the Wahlamet." Collected by Nuttall.

Range: Washington and Idaho to California and Arizona.

Specimens examined: Big Creek Prairie, *Lamb*; Clallam County, *Elmer* 2538; Klickitat County, *Suksdorf* in 1878; Skamania County, *Suksdorf* 2577; Klickitat River, *Flett* 1263;

"Columbia and Walla Walla," *Nuttall;* without locality, *Brandegee* 708; without locality, *Vasey* in 1889; Clealum, *Cotton* 855; Wenache Mountains, *Cotton* 1317, 1314, 1316, 1462; Cape Horn, *Piper* 520, 4970.

Zonal distribution: Transition or Canadian.

8. **Trifolium covillei** House, Bot. Gaz. **41**: 337. 1906.

Type locality: Bog lands in the Wenache Mountains, Kittitas County, Washington, collected by Coville.

Specimen examined: Wenache Mountains, *Coville* 1180.

9. **Trifolium pratense** L. Sp. Pl. **2**: 768. 1753. Red clover.

Type locality: European. Abundantly cultivated and established in fields and by waysides.

10. **Trifolium repens** L. Sp. Pl. **2**: 767. 1753. White clover.

Type locality: European. Established in most parts of the State.

11. **Trifolium hybridum** L. Sp. Pl. **2**: 766. 1753. Alsike clover.

Type locality: European.

Specimens examined: Pullman, *Piper,* July, 1893. Cultivated and established in fields and by waysides nearly everywhere.

12. **Trifolium albopurpureum** Torr. & Gr. Fl. **1**: 313. 1838.

Type locality: California.

Range: Washington to California west of the Cascades.

Specimens examined: Whatcom, *Suksdorf* 2578; Port Ludlow, *Binns* in 1890; Seattle, *Smith* in 1889; *Piper* in 1889.

Zonal distribution: Humid Transition.

This species has been considered identical with the Chilean *T. macraei* Hook. & Arn., but it seems amply distinct.

13. **Trifolium arvense** L. Sp. Pl. **2**: 769. 1753. Rabbit-foot clover.

Type locality: "Habitat in Europa, America septentrionali."

Specimens examined: Seattle, *Piper;* Pullman, *Piper,* July 24, 1899.

14. **Trifolium ciliolatum** Benth. Pl. Hartw. 304. 1848.

Trifolium ciliatum Nutt. Journ. Acad. Phila. n. s. **1**: 152. 1847, not Clarke 1813–16.

Type locality: "In pascuis vallis Sacramenti," California.

Range: Klickitat County, Washington, to California.

Specimens examined: Klickitat County, *Suksdorf* 44.

15. **Trifolium gracilentum** Torr. & Gr. Fl. N. Am. **1**: 316. 1838.

Type locality: California. Collected by Douglas.

Range: Washington to California.

Specimens examined: Whatcom, *Suksdorf* 1800; Port Ludlow, *Binns,* May 25, 1890.

Zonal distribution: Humid Transition.

16. **Trifolium hallii** Howell, Fl. N. W. Am. **1**: 135. 1898.

Trifolium bifidum decipiens Greene, Fl. Fran. **1**: 24. 1891, not *J. decipiens* Hornem. 1815.

Trifolium greenei House, Bot. Gaz. **41**: 334. 1906.

Type locality: "In the Bay district," California.

Range: Washington to California west of the Cascades.

Specimens examined: Alki Point, *Piper* in 1889; *Smith* in 1889; Klickitat County *Suksdorf* 8; White Salmon, *Suksdorf* 349.

Zonal distribution: Humid Transition.

17. **Trifolium procumbens** L. Sp. Pl. 2: 772. 1753.

Type locality: European.

Specimens examined: Seattle, *Piper*, July, 1895; *Suksdorf* 1804; Tacoma, *Leckenby*, May, 1898.

18. **Trifolium dubium** Sibth. Fl. Oxon. 231. 1794.

Trifolium minus Smith, Engl. Bot. *pl. 1256*. 1799.

Type locality: Near Oxford, England.

Specimens examined: Chenowith, *Suksdorf* 2585.

19. **Trifolium flavulum** Greene, Pittonia 2: 223. 1892.

Type locality: Western California.

Range: Western California.

Specimens examined: Port Ludlow, *Binns*, May 25, 1890; Whatcom, *Suksdorf* 1802; Seattle, *Piper* in 1889.

These are probably all introduced from California.

20. **Trifolium fimbriatum** Lindl. Bot. Reg. 13: *pl. 1070*. 1827.

Trifolium spinulosum Dougl.; Hook. Fl. Bor. Am. 1: 133. 1830.

Trifolium heterodon Torr. & Gr. Fl. 1: 318. 1838.

Type locality: Columbia River. Collected by Douglas.

Range: British Columbia, Washington, Oregon, and Idaho.

Specimens examined: Grays Harbor, *Lamb* 1165; Westport, *Henderson*, June 25, 1892; North Yakima, *Mrs. Steinweg*, *Henderson;* Spokane, *Piper*, *Sandberg*, *Heller*, *& MacDougal* 1028; Marshall Junction, *Piper;* Clallam County, *Elmer* 2539; Coupeville, *Gardner* 70; Seattle, *Piper* 2761; *Smith* 473; *Henderson* 2329; Olympia, *Henderson* 2329; Muckleshoot, *Dr. Ruhn;* Spangle, *Suksdorf* 272; Medical Lake, *Henderson* 2330; Walla Walla, *Lyall* in 1860; without locality, *Cooper* in 1854; Ilwaco, *Piper* 4989.

The Californian *T. wormskioldii* Lehm. is distinguished by its less deeply lobed involucre.

Zonal distribution: Transition.

21. **Trifolium tridentatum** Lindl. Bot. Reg. 13: *under pl. 1070*. 1827.

Type locality: Columbia River. Collected by Douglas.

Range: Vancouver Island to California in the coast region.

Specimens examined: Clallam County, *Elmer* 2536; Lopez Island, *Lyall* in 1858–59; Coupeville, *Gardner* 71; Tacoma, *Flett* 903; Fourth Plain, *Piper* 3073; Rock Island, *Henderson;* Vancouver, *Piper* 4933.

Zonal distribution: Humid Transition.

22. **Trifolium oliganthum** Steud. Nom. ed. 2. 2: 707. 1841.

Trifolium pauciflorum Nutt.; Torr. & Gr. Fl. 1: 319. 1838, not Urv. 1822.

Type locality: "Wet places on the higher plains of the Oregon, particularly abundant near the outlet of the Wahlamet." Collected by Nuttall.

Range: Vancouver Island to California in the coast region.

Specimens examined: Lopez Island, *Lyall* in 1858; Seattle, *Piper* 727; Tacoma, *Flett* 904, 188; Rock Island, *Henderson*, July, 1892.

Zonal distribution: Humid Transition.

23. **Trifolium variegatum** Nutt.; Torr. & Gr. Fl. 1: 317. 1838.

Trifolium melananthum Hook. & Arn. Bot. Beech. Voy. 331. 1839.

Type locality: "Springy places near the mouth of the Wahlamet," Oregon. Collected by Nuttall.

Range: British Columbia to California and Idaho.

Specimens examined: Coupeville, *Gardner* 68; Seattle, *Piper* in 1888; *Smith:* Olympia, *Henderson* 2327, 2328; west Klickitat County, *Suksdorf* 2580; Fort Vancouver, *Tolmie* (?); Yakima County, *Suksdorf* 273; Yakima, *Watt;* Ellensburg, *Whited* 491; *Elmer* 402; Egbert

Springs, *Sandberg & Leiberg* 401; Wilson Creek, *Lake & Hull* 435; Spokane, *Piper;* Spokane County, *Suksdorf* 2581; Meyers Falls, *Kreager* 504; Prosser, *Cotton* 737, 810; without locality, *Vasey* in 1889.

Zonal distribution: Upper Sonoran and Transition.

24. **Trifolium cyathiferum** Lindl. Bot. Reg. **13**: under *pl. 1070*. 1827.

Type locality: "Columbia River." Collected by Douglas.

Range: British Columbia to Idaho and north California.

Specimens examined: Klickitat County, *Suksdorf* 9; Klickitat River, *Flett* 1263a; junction Crab and Wilson creeks, *Sandberg & Leiberg* 303; Spokane County, *Suksdorf* 2584; Pullman, *Piper* 1484; Clealum, *Henderson*, June, 1892; Wilson Creek, *Lake & Hull* 433; Blue Mountains, *Horner* 316.

Zonal distribution: Arid Transition.

25. **Trifolium microdon** Hook. & Arn. Hook. Bot. Misc. **3**: 180. 1833.

Type locality: Valparaiso, Chile.

Range: Vancouver Island to California. Chile.

Specimens examined: Oyhut, *Lamb* 1266; Bellingham Bay, *Suksdorf* 1803; Alki Point, *Piper* in 1889; Port Ludlow, *Binns;* Cascade Mountains, latitude 49°, *Lyall;* Ilwaco, *Piper* 4994, 4961.

Zonal distribution: Humid Transition.

26. **Trifolium microcephalum** Pursh, Fl. **2**: 478. 1814.

Type locality: "On the banks of Clark's River." Collected by Lewis. The exact spot is on the Bitter Root River, Montana, near the mouth of the Lolo.

Range: British Columbia to west Montana and California.

Specimens examined: Whidby Island, *Gardner* 69; Puget Sound, *Suckley;* Everett, *Piper*, July, 1892; Tacoma, *Flett* 905; Charleston, *Piper*, July, 1895; Woodlawn, *Henderson*, June, 1892; Ellensburg, *Elmer* 404; Egbert Springs, *Sandberg & Leiberg* 421; Muckleshoot, *Dr. Ruhn;* Wilson Creek, *Lake & Hull* 434; Spokane, *Piper*, July, 1896; *Dewart* in 1900; *Henderson*, July, 1892; Spangle, *Suksdorf* 274; Coppei River, *Horner* 597; without locality, *Vasey* in 1889; Clarks Springs, *Kreager* 138; Fort Vancouver, *Scouler*.

Zonal distribution: Transition.

MEDICAGO.

Annual; flowers yellow.
  Pod, 1-seeded, black, reticulate .... 1. *M. lupulina.*
  Pod several-seeded, twisted, spiny on the edge .... 2. *M. denticulata.*
Perennial; flowers violet .... 3. *M. sativa.*

1. **Medicago lupulina** L. Sp. Pl. **2**: 779. 1753. Yellow trefoil.

Type locality: European.

Specimens examined: Fairhaven, *Piper*, July, 1897; Seattle, *Piper*, July, 1895; Bingen, *Suksdorf* 2587; Walla Walla, *Leckenby*, May, 1898.

2. **Medicago denticulata** Willd. Sp. Pl. **3**: 1414. 1803. Bur clover.

Type locality: None cited.

Specimens examined: Whatcom, *Suksdorf* 1806; Tacoma, *Flett* 52; Seattle, *Piper* in 1888.

3. **Medicago sativa** L. Sp. Pl. **2**: 778. 1753. Alfalfa.

Type locality: "Habitat in Hispaniae, Galliae apricis."

Abundantly cultivated, especially in eastern Washington, and a frequent escape.

PSORALEA.

Leaflets broadly ovate .... 1. *P. physodes.*
Leaflets lanceolate .... 2. *P. lanceolata.*

1. **Psoralea physodes** Dougl.; Hook. Fl. Bor. Am. **1**: 136. 1830.

TYPE LOCALITY: "From the Great Falls of the Columbia to the Rocky Mountains." Collected by Douglas.

RANGE: British Columbia to Idaho and north California.

SPECIMENS EXAMINED: San Juan Island, *Lyall* in 1858; Coupeville, *Gardner* 89; Seattle, *Piper* 58; between Olympia and Gate City, *Heller* 4049; White Bluff Ferry, *Lake & Hull* August, 1892; without locality, *Cooper*.

ZONAL DISTRIBUTION: Humid Transition.

Through an unquestionable error Piper no. 58 was referred to *P. pedunculata* Mill. in the Torrey Bulletin.[a] The latter species is not known west of the Rocky Mountains.

The type locality as above given is very likely the result of an error. This species is at present known from east of the Cascade Mountains at but a single station—near Troy, Idaho.

2. **Psoralea lanceolata scabra** (Nutt.).

Psoralea scabra Nutt.; Torr. & Gr. Fl. **1**: 300. 1838.

Psoralea purshii Vail, Bull. Torr. Club **21**: 94. 1889.

TYPE LOCALITY: "On the Walla-Wallah." Collected by Townsend.

RANGE: Eastern Washington and eastern Oregon.

SPECIMENS EXAMINED: Egbert Springs, *Sandberg & Leiberg* 384; Morgans Ferry, *Suksdorf* 275; White Bluffs, *Dunn* 206; White Bluff Ferry, *Lake & Hull* 664; Columbia River, latitude 46° to 49°, *Lyall* in 1860; west Klickitat County, *Suksdorf* 963; Moses Lake, *Sandberg & Leiberg*, July, 1893; Almota, *Piper* 1851; Wawawai, *Lake & Hull* 429; *Elmer* 748; Pasco, *Henderson*, June, 1892; Sentinel Bluffs, *Cotton* 1364; Craigs Ferry, *Cotton*.

ZONAL DISTRIBUTION: Upper Sonoran.

This plant as to type specimen differs from *P. lanceolata* Pursh only in its white villous pods, and all intergrades as to the amount of this pubescence occur.

GLYCYRRHIZA.

1. **Glycyrrhiza lepidota** Nutt. Gen. **2**: 106. 1818. WILD LICORICE

TYPE LOCALITY: "St. Louis," Missouri.

RANGE: Washington to Hudson Bay, Arkansas, and New Mexico.

SPECIMENS EXAMINED: Egbert Springs, *Sandberg & Leiberg* 342; west Klickitat County, *Suksdorf* 1809; Almota, *Piper* 1582; Wawawai, *Piper* 1482; Spokane, *Kreager* 539.

ZONAL DISTRIBUTION: Upper Sonoran.

This species has been reported as a bad weed in Washington, but there is no recent evidence to this effect.

1a. **Glycyrrhiza lepidota glutinosa** (Nutt.) S. Wats. Bot. Cal. **1**: 144. 1876.

Glycyrrhiza glutinosa Nutt.; Torr. & Gr. Fl. **1**: 298. 1838.

TYPE LOCALITY: "Banks of Lewis's River" in South Idaho. Collected by Nuttall.

RANGE: Washington and Idaho to California.

SPECIMENS EXAMINED: Columbia River, latitude 46° to 49°, *Lyall*.

HOSACKIA.

Perennials; flowers in umbels.
  Pods linear, glabrous, many-seeded.
    Leaflets 5 to 9, glabrous or nearly so.
      Peduncles usually naked; corolla with yellow standard and white wings .... 1. *H.* ***bicolor***.
      Peduncles with a bract at the umbel; corolla with yellow standard and purple wings .... 2. *H.* ***gracilis***.
    Leaflets 9 to 15; flowers purple .... 3. *H.* ***crassifolia***.

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[a] Bull. Torr. Club **21**: 114. 1894.

Pods curved, pubescent, 1 or 2-seeded; flowers yellow; foliage pubescent .... 4. *H. decumbens*.

Annuals; flowers solitary or sometimes two on the peduncles of the first species.

Peduncles usually exceeding the leaves.

Flowers 3 to 4 mm. long; leaflets oblong to ovate, usually glabrous .... 5. *H. parviflora*.

Flowers 5 to 6 mm. long; leaflets ovate to lanceolate, usually villous .... 6. *H. americana*.

Peduncles very short, the flowers nearly sessile; calyx lobes denticulate .... 7. *H. denticulata*.

1. **Hosackia bicolor** Dougl. Bot. Reg. **15**: *pl. 1257*. 1829.

Lotus pinnatus Hook. Bot. Mag. **56**: *pl. 2913*. 1829 (December 1).

TYPE LOCALITY: "In overflowed meadows between Fort Vancouver and the Grand Rapids of the Columbia." Collected by Douglas.

RANGE: Washington and Idaho to California.

SPECIMENS EXAMINED: Woodlawn, *Henderson*, June, 1892; Olympia, *Kincaid*, July, 1896; Mount Stuart, *Elmer* 1161; Columbia Valley, *Lyall* in 1860; Palouse River, *Lyall* in 1860; Pullman, *Hull* 782; without locality, *Cooper*; Seattle, *Piper* in 1888.

ZONAL DISTRIBUTION: Transition.

2. **Hosackia gracilis** Benth. Trans. Linn. Soc. **17**: 365. 1837.

Lotus formosissimus Greene, Pittonia **2**: 147. 1890.

TYPE LOCALITY: California. Collected by Douglas.

RANGE: Washington to Monterey Bay, California.

SPECIMENS EXAMINED: Montesano, *Heller* 3934; *Henderson* 2350.

3. **Hosackia crassifolia** Benth. Trans. Linn. Soc. **17**: 365. 1837.

Hosackia stolonifera Lindl. Bot. Reg. **23**: *pl.* 1977. 1837.

Hosackia platycarpa Nutt.; Torr. & Gr. Fl. **1**: 323. 1838.

Lotus crassifolius Greene, Pittonia **2**: 147. 1890.

TYPE LOCALITY: California. Collected by Douglas.

RANGE: Washington to southern California.

SPECIMENS EXAMINED: Montesano, *Heller* 3925; Mason County, *Piper* 1044; Chehalis County, *Lamb* 1170; Tacoma, *Flett* 55; Steilacoom, *Howell* in 1878; Dalles, *Lyall* in 1860; Klickitat County, *Suksdorf*.

ZONAL DISTRIBUTION: Transition.

4. **Hosackia decumbens** Benth. Bot. Reg. **15**: *under pl. 1257*. 1829.

Lotus douglasii Greene, Pittonia **2**: 149. 1890.

TYPE LOCALITY: "Northwest coast of America." Collected by Douglas.

RANGE: Washington to Idaho and California.

SPECIMENS EXAMINED: Mason County, *Piper* 57; between Olympia and Gate City, *Heller* 4047; west Klickitat County, *Suksdorf* 112; Loon Lake, *Winston*, July 20, 1897; Spokane, *Piper*, July, 1896; *Henderson*, July, 1892; *Elmer* 376; Spokane, *Kreager* 2; Dalles, *Lyall* in 1860.

ZONAL DISTRIBUTION: Transition.

5. **Hosackia parviflora** Benth. Bot. Reg. **15**: *under pl. 1257*. 1829.

Hosackia microphylla Nutt.; Torr. & Gr. Fl. **1**: 326. 1838.

Lotus micranthus Benth. Trans. Linn. Soc. **17**: 367. 1837.

TYPE LOCALITY: "Northwest coast of America." Collected by Douglas.

RANGE: British Columbia to California west of the Cascades.

SPECIMENS EXAMINED: Montesano, *Heller* 3911; Chehalis County, *Lamb* 1151; Seattle, *Piper*, July, 1895; Olympia, *Henderson*, May, 1892; Port Ludlow, *Binns*, May 5, 1889; west Klickitat County, *Suksdorf* 533; without locality, *Cooper; Lyall;* Vancouver, *Piper* 4930.

ZONAL DISTRIBUTION: Humid Transition.

6. Hosackia americana (Nutt.).

Trigonella americana Nutt. Gen. **2**: 120. 1818.
Lotus sericeus Pursh, Fl. **2**: 489. 1814, not DC. 1813.
Hosackia purshiana Benth. Bot. Reg. **15**: *pl. 1257*. 1829.
?*Hosackia unifoliata* Hook. Fl. Bor. Am. **1**: 135. 1830.
Hosackia elata glabra Nutt.; Torr. & Gr. Fl. **1**: 327. 1838.
Hosackia elata Nutt. loc. cit.
Hosackia floribunda Nutt. loc. cit.

Type locality: "On the banks of the Missouri."

Range: Washington to Minnesota, south to California and Texas.

Specimens examined: Ellensburg, *Whited* 578; North Yakima, *Watt;* Rock Island, *Sandberg & Leiberg* 427; Wenache, *Whited* 1148; Tacoma, *Flett* 902; Falcon Valley, *Suksdorf* 2332; Fort Colville, *Lyall* in 1860; Lake Chelan, *Lake & Hull* 430; Chelan, *Elmer* 493; Rock Lake, *Lake & Hull*, August 3, 1892; head of Grand Coulee, *McKay* 24; Pullman, *Hull* in 1892; Wawawai, *Piper* 1483; without locality, *Vasey* 270; Mount Carlton, *Kreager* 155; Clarks Springs, *Kreager* 108; Rattlesnake Mountains, *Cotton* 692; Walla Walla, *Griffiths & Cotton* 552.

Zonal distribution: Arid Transition and Upper Sonoran.

Nuttall's *Hosackia elata glabra* is a nearly glabrous plant matched by Cotton's 801 from Toppenish. It should perhaps be accorded subspecific rank.

6a. Hosackia americana pilosa (Nutt.).

Hosackia pilosa Nutt.; Torr. & Gr. Fl. **1**: 327. 1838.
Hosackia mollis Nutt. loc. cit.

Type locality: "Plains of the Rocky Mountain range, towards the Oregon."

Range: Washington, Oregon, and Idaho.

Specimens examined: Pullman, *Hull*, July 16, 1892.

7. Hosackia denticulata Drew, Bull. Torr. Club **16**: 151. 1889.

Lotus denticulatus Greene, Pittonia **2**: 139. 1890.

Type locality: "Mad River near Jarnigan's," California.

Range: Washington to California.

Specimens examined: Gulf of Georgia, *Henderson* in 1892; Whidby Island, *Gardner* 66; Fairhaven, *Piper* 2809; Columbia River, latitude 46° to 49°, *Lyall* in 1860; Ellensburg, *Elmer* 370; *Whited* 509; *Piper* 2713; without locality, *Vasey* in 1889; Colville Reservation, *Griffiths & Cotton* 371.

Zonal distribution: Upper Sonoran and Transition.

This species has been confused with *H. subpinnata* Torr. & Gr., from which it appears clearly distinct.

HEDYSARUM.

Flowers purple .... 1. *H. occidentale.*
Flowers yellowish .... 2. *H. sulphurescens.*

1. Hedysarum occidentale Greene, Pittonia **3**: 19. 1896.

Hedysarum uintahense A. Nelson, Proc. Biol. Soc. Wash. **15**: 186. 1902, at least in part.

Type locality: Olympic Mountains, Washington.

Range: Washington to Saskatchewan and Wyoming.

Specimens examined: Olympic Mountains, *Piper* 2227; *Henderson* 1850; *J. M. Grant* 156; Baldy Peak, *Lamb* 1318; without locality, *Sandberg & Leiberg* 494; Clallam County, *Elmer* 2529.

Zonal distribution: Arctic.

This species is very close to *H. boreale* Nutt. (*H. americanum* (Michx.) Britton.), perhaps not distinct from it.

2. Hedysarum sulphurescens Rydberg, Bull. Torr. Club **24**: 251. 1897.

Hedysarum flavescens Coult. & Fisher, Bot. Gaz. **18**: 300. 1893, not Regel & Schmalh. 1882.

TYPE LOCALITY: Helena, Montana.

RANGE: British Columbia to Saskatchewan and Wyoming.

SPECIMENS EXAMINED: Loomis, *Elmer* 551.

ARAGALLUS. LOCOWEED.

1. Aragallus gracilis A. Nelson, Erythea **7**: 60. 1899.

TYPE LOCALITY: "Limestone Range in the Black Hills, Wyoming."

RANGE: Washington to Montana and Wyoming.

SPECIMENS EXAMINED: Olympic Mountains, *Elmer* 2532; Loomis, *Elmer* 595.

Professor Greene erects a new species, *A. luteolus*, on Elmer's 2532.[a]

2. Aragallus monticola (A. Gray) Greene, Pittonia **3**: 212. 1897.

Oxytropis monticola A. Gray, Proc. Am. Acad. **20**: 6. 1885.

TYPE LOCALITY: Northwestern Wyoming. Collected by Parry.

RANGE: Washington to Wyoming, Dakota, and Alberta.

SPECIMENS EXAMINED: Olympic Mountains, *Grant* 21; *Flett* 134, 803; Goat Mountains, *Allen* 245.

PHACA. MILK VETCH.

Pods membranaceous, thin, much inflated.
Herbage slightly pubescent; pods 2-celled .... 1. *P. lentiginosa.*
Herbage silky or villous; pods 1-celled.
Pods very thin, 3 to 5 cm. long .... 2. *P. hookeriana.*
Pods firm, 10 to 12 mm. long .... 3. *P. suksdorfii.*
Pods coriaceous or chartaceous, not inflated.
Herbage long-hairy or woolly.
Pods woolly or villous, not compressed.
Pods 1-celled, somewhat curved, soft-woolly.
Flowers ochroleucous .... 4. *P. purshii.*
Flowers purple.
Stems elongate, prostrate; leaflets 21 to 25 .... 5. *P. inflexa.*
Stems erect, very short; leaflets 7 to 11 .... 6. *P. glareosa.*
Pods 2-celled, small, ovate, short-villous.
Spike dense; flowers 10 mm. long .... 7. *P. spaldingii.*
Spike loose; flowers 6 mm. long .... 8. *P. lyallii.*
Pods glabrous, strongly compressed, falcate .... 9. *P. succumbens.*
Herbage and pods glabrous or short-pubescent.
Pods conspicuously stipitate, the stipe equaling or exceeding the calyx.
Calyx oblique; pods curved or coiled, the sutures prominent.
Pods coiled, glabrous .... 10. *P. speirocarpa.*
Pods curved, not coiled.
Leaflets 5 to 7 pairs, oblong or obovate; stipe as long as the calyx .... 11. *P. sinuata.*
Leaflets 6 to 9 pairs, linear; stipe much exceeding the calyx .... 12. *P. podocarpa.*
Calyx not oblique; pods straight or nearly so.
Neither suture of the pods impressed.

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[a] Proc. Biol. Soc. Wash. **18**: 17. 1905.

Pods somewhat flattened, pendent, smooth and shining.................................. 15. *P. stenophylla.*
Pods not at all flattened.
Flowers and pods reflexed................ 16. *P. collina.*
Flowers spreading; pods erect............ 17. *P. tweedyi.*
One of the sutures of the pod impressed or intruded.
Pods compressed.
Pods reflexed, the dorsal suture intruded to divide the pod into 2 cells........... 13. *P. misella.*
Pods pendent, the ventral suture intruded. 14. *P. alpina.*
Pods obcompressed, the dorsal suture impressed.
Leaflets glabrous, broadly oval........... 18. *P. beckwithii.*
Leaflets pubescent, lance-oblong.......... 19. *P. arrecta.*
Pods sessile or nearly so.
Pods 2-celled by the intrusion of the sutures.
Flowers greenish or yellowish; pods oblong........ 20. *P. mortoni.*
Flowers purple or purplish.
Pods oblong; flowers spicate.................... 21. *P. adsurgens.*
Pods ovate; flowers capitate.................. 22. *P. agrestis.*
Pods 1-celled.
Flowers subsessile in the leaf axils; leaflets rigid, prickly-pointed................................ 30. *P. viridis.*
Flowers in racemes or spikes; leaflets not rigid nor prickly-pointed.
Inflorescence racemose; pods not linear.
Pods subglobose, pubescent, chartaceous.. 26. *P. misera.*
Pods oblong or ovate, coriaceous.
Sutures of the turgid pod both prominent; flowers greenish.............. 23. *P. reventa.*
Sutures of the pod not both prominent, the dorsal impressed.
Flowers greenish; leaflets 21 to 29. 24. *P. hoodiana.*
Flowers purplish; leaflets 11 to 21. 25. *P. conjuncta.*
Inflorescence spicate; pods linear, chartaceous.
Keel of the corolla with a long inflexed beak. 27. *P. convallaria.*
Keel of the corolla short-beaked.
Calyx teeth nearly as long as the tube. 28. *P. decumbens.*
Calyx teeth one-third as long as the tube.............................. 29. *P. serotina.*

1. Phaca lentiginosa (Dougl.).

Astragalus lentiginosus Dougl.; Hook. Fl. Bor Am. **1**: 151. 1830.

? *Astragalus diaphanus* Dougl.; Hook. Fl. Bor. Am. **1**: 151. 1830.

TYPE LOCALITY: "Subalpine ranges of the Blue Mountains." Collected by Douglas.

RANGE: Washington to Nevada and California.

SPECIMENS EXAMINED: Coulee City, *Piper* 3885; *Henderson* 2353; between Coulee City and Waterville, *Spillman*, May, 1896; Wilson Creek, *Lake & Hull* 663; Ellensburg, *Piper* 2674; Toppenish, *Piper*, July 10, 1897; Sprague, *Sandberg & Leiberg* 132; Cow Creek, *Lyall* in 1860; Klickitat County, *Howell*; Coulee City, *Piper* 3885; Washtucna, *Cotton* 975.

ZONAL DISTRIBUTION: Upper Sonoran.

Astragalus diaphanus Dougl., said to be abundant "on sandy soil near the Great Falls of the Columbia," has never been satisfactorily identified. While possibly referable to *A. lentiginosus*, the characters of "pilose-scabrous" herbage and "linear falcate" pods point strongly to some other species.

2. **Phaca hookeriana** Torr. & Gr. Fl. **1**: 693. 1840.

Astragalus hookerianus A. Gray, Proc. Am. Acad. **6**: 215. 1864.

Astragalus olympicus Cotton, Bull. Torr. Club **29**: 573. 1902.

TYPE LOCALITY: "Interior of Oregon." Collected by Douglas.

RANGE: Washington to Nevada and California.

SPECIMENS EXAMINED: Olympic Mountains, *Elmer* 2531; Mount Stuart, *Brandegee* 725; upper Yakima River, *Brandegee* 33; Blue Mountains, *Piper* 2405; *Horner* B146.

ZONAL DISTRIBUTION: Hudsonian.

3. **Phaca suksdorfii** (Howell).

Astragalus suksdorfii Howell, Erythea **1**: 111. 1893.

TYPE LOCALITY: "In loose volcanic soil near the base of Mount Adams," Washington. Collected by Suksdorf.

RANGE: Known only from the type locality.

SPECIMENS EXAMINED: Falcon Valley, *Suksdorf* 113.

4. **Phaca purshii** (Dougl.).

Astragalus purshii Dougl.; Hook. Fl. Bor. Am. **1**: 152. 1830.

TYPE LOCALITY: "On the low hills of the Spokan River," Washington. Collected by Douglas.

RANGE: British Columbia and Washington to California and Utah.

SPECIMENS EXAMINED: Wenache, *Whited* 1023; Fort Colville, *Lyall* in 1861; Coulee City, *Piper* 3861; Spokane, *Piper* 2288; *Henderson* 2357; *Sandberg & Leiberg*, May, 1893; Hangman Creek, *Sandberg & Leiberg* 18; Spangle, *Piper*, May, 1898; Chelan Butte, *Griffiths & Cotton* 168.

ZONAL DISTRIBUTION: Arid Transition.

4a. **Phaca purshii tincta** (Jones).

Astragalus purshii tinctus Jones, Zoe **4**: 269. 1893.

TYPE LOCALITY: "Edgewood, near Mt. Shasta," California.

RANGE: Washington to California and Nevada.

SPECIMENS EXAMINED: Bingen, *Suksdorf* 50.

5. **Phaca inflexa** (Dougl.).

Astragalus inflexus Dougl.; Hook. Fl. Bor. Am. **1**: 151. 1830.

TYPE LOCALITY: "On the barren sandy grounds of the Columbia, from the junction of Lewis and Clarke's River to the Mountains." Collected by Douglas.

RANGE: Washington, Idaho, and Oregon.

SPECIMENS EXAMINED: Opposite Umatilla, *Howell* 42; Kooskooskee to Walla Walla, *Wilkes Expedition* 529; without locality, *Brandegee* 722; Wawawai, *Elmer* 112; *Hull* in 1892; Almota, *Piper* 1492, 2938; Illia, *Lake & Hull* 665; without locality, *Vasey* in 1889; without locality, *Sandberg & Leiberg* in 1892.

ZONAL DISTRIBUTION: Upper Sonoran.

6. **Phaca glareosa** (Dougl.).

Astragalus glareosus Dougl.; Hook. Fl. Bor. Am. **1**: 52. 1830.

Astragalus allanaris Sheldon, Minn. Bot. Studies **1**: 141. 1894.

TYPE LOCALITY: "Plentiful on dry gravelly banks of rivers, from the confluence of Lewis and Clarke's River with the Columbia to the mountains." Collected by Douglas.

RANGE: Eastern Washington.

SPECIMENS EXAMINED: Ellensburg, *Piper* 2680; *Whited*, April, 1897, and 18; North Yakima, *Mrs. Steinweg* in 1894; *Leckenby*, April, 1898; *Henderson* 2356; Pasco, *Hindshaw* 46; Coulee City, *Piper* 3861; Rattlesnake Mountains, *Cotton* 552.

The above identification of Douglas's *A. glareosus* with Sheldon's *A. allanaris* is not without misgivings, but the original description points to this species rather than to any other.

7. **Phaca spaldingii** (A. Gray).

Astragalus spaldingii A. Gray, Proc. Am. Acad. 6: 524. 1865.

Astragalus chaetodon Torr.; A. Gray, Proc. Am. Acad. 6: 194. 1866, not Bunge, 1851.

TYPE LOCALITY: "Clearwater" River, Idaho. Collected by Spalding.

RANGE: Northern Idaho and adjacent Washington and Idaho.

SPECIMENS EXAMINED: Sprague, *Sandberg & Leiberg* 149b; *Henderson* in 1892; Rattlesnake Mountains, *Suksdorf* 283; Walla Walla region, *Brandegee* 716; Pullman, *Piper* 1494; *Henderson* in 1892; Connell, *Leckenby*, June, 1897.

ZONAL DISTRIBUTION: Arid Transition.

8. **Phaca lyallii** (A. Gray).

Astragalus lyallii A. Gray, Proc. Am. Acad. 6: 195. 1865.

TYPE LOCALITY: "Upper Yakima River," Washington. Collected by Lyall in 1860.

RANGE: Eastern Washington.

SPECIMENS EXAMINED: Ellensburg, *Elmer* 366; *Henderson* 2354; *Piper* 2683; North Yakima, *Henderson* 2354; Upper Yakima River, *Lyall* in 1860; Morgans Ferry, *Suksdorf* 282; Pasco, *Hindshaw* 52; Coulee City, *Piper* 3856; Sprague, *Sandberg & Leiberg* 149a; Walla Walla Region, *Brandegee* 717; without locality, *Vasey* in 1889; Rattlesnake Mountains, *Griffiths & Cotton* 23; Prosser, *Griffiths & Cotton* 3.

ZONAL DISTRIBUTION: Upper Sonoran.

9. **Phaca succumbens** (Dougl.).

Astragalus succumbens Dougl.; Hook. Fl. Bor. Am. 1: 151. 1830.

Astragalus dorycnioides Dougl.; G. Don, Hist. Dichl. Pl. 2: 151. 1832.

TYPE LOCALITY: "On the barren grounds of the Columbia and near the Wallawallah River." Collected by Douglas.

RANGE: Eastern Washington and Eastern Oregon.

SPECIMENS EXAMINED: Klickitat, *J. Howell*; Pasco, *Hindshaw*, May, 1896; Wallula, *Brandegee* 719; Hunts Junction, *Leckenby*, May, 1898; Walla Walla, *Lyall* in 1860; Wallula, *Cotton* 1063, 1040; Craigs Ferry, *Cotton* 1342.

ZONAL DISTRIBUTION: Upper Sonoran.

10. **Phaca speirocarpa** (A. Gray).

Astragalus speirocarpus A. Gray, Proc. Am. Acad. 6: 225. 1865.

TYPE LOCALITY: "Wenass" River, Washington. Collected by Lyall.

RANGE: Eastern Washington.

SPECIMENS EXAMINED: Yakima, *Leckenby*, May, 1898; North Yakima, *Leckenby*, April 22, 1898; Yakima County, *Brandegee* 32, 728; *Henderson* 2351; Naches Valley, *Piper* 2758; Morgans Ferry, *Suksdorf* 277; Bickleton, *Suksdorf* 278; Wenas, *Lyall* in 1860; opposite Alkali, *Howell* 46; Moxee, *Griffiths & Cotton* 45; between Mabton and Satus, *Cotton* 1117.

ZONAL DISTRIBUTION: Upper Sonoran.

11. **Phaca sinuata** (Piper).

Astragalus sinuatus Piper, Bull. Torr. Club, 28: 40. 1901.

Astragalus whitedii Piper, Bull. Torr. Club, 29: 224. 1902.

TYPE LOCALITY: Eastern Washington. Collected by Brandegee.

RANGE: Eastern Washington.

SPECIMENS EXAMINED: Colockum Creek, *Whited* 1353; Eastern Washington, *Brandegee* 739.

12. **Phaca podocarpa** Hook. Fl. Bor. Am. 1: 142. 1830.

Astragalus sclerocarpus A. Gray, Proc. Am. Acad. 6: 225. 1865.

TYPE LOCALITY: "Great [Celilo] Falls of the Columbia." Collected by Douglas.

RANGE: Eastern Washington and Eastern Oregon.

SPECIMENS EXAMINED: Ellensburg, *Hindshaw*, May, 1896; North Yakima, *Henderson* 2352; Morgans Ferry, *Suksdorf* 279, 280; near the Great Falls of the Columbia, *Douglas*;

near Columbia River, Yakima County, *Brandegee* 727; Columbia Valley, *Lyall* in 1860; Pasco, May 26, 1899; *Henderson* 2352; opposite Willows, *Howell;* Junction Crab and Wilson creeks, *Sandberg & Leiberg* 312; near Eltopia, *Cotton* 1021; near Delight, *Cotton* 999; Wallula, *Cotton* 1043.

ZONAL DISTRIBUTION: Upper Sonoran.

13. **Phaca misella** (S. Wats.).

Astragalus misellus S. Wats. Proc. Am. Acad. **21**: 449. 1886.

TYPE LOCALITY: Mitchell, Oregon. Collected by Howell.

RANGE: Eastern Oregon and Eastern Washington.

SPECIMENS EXAMINED: Ellensburg, *Whited* 291; *Piper* 2681.

ZONAL DISTRIBUTION: Upper Sonoran.

14. **Phaca alpina** (L.).

Astragalus alpinus L. Sp. Pl. **2**: 760. 1753.

TYPE LOCALITY: "Habitat in alpibus Lapponicis, Helveticis."

RANGE: British Columbia to Hudson Bay and Colorado.

SPECIMENS EXAMINED: Damp thickets, Conconully, *Whited* 1307.

15. **Phaca stenophylla** (Torr. & Gr.).

Astragalus stenophyllus Torr. & Gr. Fl. **1**: 329. 1838.

Astragalus leptophyllus Nutt. Journ. Acad. Phila. **7**: 18. 1834, not Desf. 1800.

Astragalus filipes Torr. Bot. Wilkes Exped. 278. 1874.

TYPE LOCALITY: "Headwaters of the Missouri." Collected by Wyeth.

RANGE: British Columbia to Montana and California.

SPECIMENS EXAMINED: Ellensburg, *Whited* 565; *Piper* 2717; Johnsons Canyon, Yakima County, *Brandegee* 732; between Coulee City and Waterville, *Spillman*, May, 1896; Coulee City, *Henderson* 2358; Ritzville, *Sandberg & Leiberg*, June, 1893; Crab Creek, *Suksdorf* 281; without locality, *Vasey* in 1889; Grand Coulee, *Griffiths & Cotton* 440.

ZONAL DISTRIBUTION: Upper Sonoran.

16. **Phaca collina** Hook. Fl. Bor. Am. **1**: 141. 1830.

Astragalus collinus Dougl.: G. Don, Hist. Dichl. Pl. **2**: 256. 1832.

Astragalus cyrtoides A. Gray, Proc. Am. Acad. **6**: 201. 1865.

TYPE LOCALITY: "On the subalpine range of the Blue Mountains, in dry soils." Collected by Douglas.

RANGE: Washington, Oregon, and Idaho.

SPECIMENS EXAMINED: Columbia Valley, *Lyall* in 1860: Ritzville, *Sandberg & Leiberg* 196: Sprague, *Henderson* 2360: *Sandberg & Leiberg* in 1893; Wawawai, *Elmer* 749; *Piper* 1792: Waitsburg, *Horner* 98: Wallula, *Brandegee* 730.

ZONAL DISTRIBUTION: Upper Sonoran.

17. **Phaca tweedyi** (Canby).

Astragalus tweedyi Canby, Bot. Gaz. **15**: 150. 1890.

TYPE LOCALITY: "In prairies, Eastern Oregon."

RANGE: Eastern Washington and Eastern Oregon.

SPECIMENS EXAMINED: Hills along Columbia River, Yakima County, *Brandegee* 731.

18. **Phaca beckwithii** (Torr. & Gr.).

Astragalus beckwithii Torr. & Gr. Pac. R. Rep. 2^2: 120. 1854.

TYPE LOCALITY: "Cedar Mountains," Utah.

RANGE: British Columbia to Utah and California.

SPECIMENS EXAMINED: Tukanon River, *Brandegee* 726.

19. **Phaca arrecta** (A. Gray).

Astragalus arrectus A. Gray, Proc. Am. Acad. **8**: 289. 1870.

Astragalus palousensis Piper, Bot. Gaz. **22**: 489. 1896.

Astragalus arrectus palousensis Jones, Contr. Western Bot. **10**: 68. 1902.

Type locality: Kooskooskee [Clearwater] River, Idaho. Collected by Geyer.

Range: Eastern Washington, Eastern Oregon, and adjacent Idaho.

Specimens examined: Pullman, *Piper* 1493; *Elmer* in 1896; without locality, *Vasey* in 1889.

Zonal distribution: Arid Transition.

19a. Phaca arrecta leibergii (Jones).

Astragalus arrectus leibergii Jones, Contr. Western Bot. **10**: 68. 1902.

Astragalus leibergii Jones, Proc. Cal. Acad. II. **5**: 663. 1895.

Type locality: "Egbert Springs," Douglas County, Washington. Collected by Sandberg & Leiberg.

Range: Eastern Washington.

Specimens examined: Egbert Springs, *Sandberg & Leiberg* 354.

20. Phaca mortoni (Nutt.).

Astragalus mortoni Nutt. Journ. Acad. Phila. **7**: 19. 1834.

Type locality: "About the sources and upper branches of the Missouri." Collected by Nuttall.

Range: Washington to Saskatchewan, Dakota, and Nevada.

Specimens examined: Ellensburg, *Whited;* North Yakima, *Henderson*, May, 1892; *Watt*, August, 1895; *Mrs. Steinweg* in 1894; Simcoe Valley, *Lyall* in 1860; Egbert Springs, *Sandberg & Leiberg* 341; Beaver Creek, *Whited* 22, 232; Wilson Creek, *Lake & Hull* 667; Spokane, *Henderson*, July, 1892; *Piper*, June, 1897; Blue Mountains, *Piper*, July, 1896; Almota, *Piper* 1864; without locality, *Vasey* in 1889; Clarks Springs, *Kreager* 79.

Zonal distribution: Arid Transition and Upper Sonoran.

21. Phaca adsurgens (Pall.).

Astragalus adsurgens Pall. Astrag. 40. *pl. 31*. 1800.

Astragalus adsurgens robustior Hook. Fl. Bor. Am. **1**: 149. 1830.

Astragalus nitidus Dougl.; Hook. loc. cit. as synonym.

Astragalus striatus Nutt.; Torr. & Gr Fl. **1**: 330. 1838.

Type locality: "In regionem Trans-Baicalensibus, frequens ad Selengum, Ononem circa Tarei-noor et usque in Mongoliae desertum."

Range: British Columbia to Saskatchewan, south to Oregon and Kansas. Siberia.

Specimens examined: Silver Lake, *Henderson* 2359.

22. Phaca agrestis (Dougl.).

Astragalus agrestis Dougl.; Hook. Fl. Bor. Am. **1**: 148. 1830. as synonym.

Astragalus hypoglottis of American authors.

Type locality: "On the fertile plains of the Red River, and in the south, towards Pembina."

Range: Alaska to Hudson Bay, Nebraska, and Colorado.

Specimens examined: Ophir, *Elmer* 422; Ellensburg, *Whited* 457; Coulee City, *Piper* 3872; *Spillman*, May, 1896; Sprague, *Henderson* 2361; *Sandberg & Leiberg* 137; Spokane County, *Mrs. Susan Tucker*, in 1892; Spangle, *Piper*, June, 1899; Crab Creek, *Sukedorf* 286; Loomis, *Griffiths & Cotton* 344; Okanogan, *Griffiths & Cotton* 265.

Zonal distribution: Arid Transition.

23. Phaca reventa (A. Gray).

Astragalus reventus A. Gray, Proc. Am. Acad. **15**: 46. 1879.

Type locality: "Interior of Oregon." Collected by Lyall.

Range: Eastern Oregon and Eastern Washington.

Specimens examined: North Yakima, *Henderson* in 1892; *Mrs. Steinweg;* Tampico, *Henderson* in 1892; Klickitat County, *J. Howell*, in 1878 and 1882. Cleman Mountain, *Henderson;* Bishops, *Piper* 2887; Wawawai, *Elmer* 795, 3059; Blue Mountains, *Lake & Hull* 688; without locality, *Vasey*, in 1889.

Zonal distribution: Arid Transition.

23a. Phaca reventa canbyi (Jones).

Astragalus reventus canbyi Jones, Contr. Western Bot. **8**: 11. 1898.

Type locality: "Yakima Region," Washington. Collected by Brandegee.

Range: Central Washington.

Specimens examined: Yakima Region, *Brandegee* 36.

24. Phaca hoodiana (Howell).

Astragalus hoodianus Howell, Erythea **1**: 111. 1893.

Astragalus conjunctus oxytropidoides Jones, Proc. Cal. Acad. II. **5**: 665. 1895.

Type locality: "Hood River to a point a few miles east of The Dalles," Oregon.

Range: Klickitat County, Washington, and adjacent Oregon.

Specimens examined: Mountains east of Lyle, *Suksdorf* 2589; west Klickitat County, *Suksdorf* 2588.

25. Phaca conjuncta (S. Wats.).

Astragalus conjunctus S. Wats. Proc. Am. Acad. **17**: 371. 1882.

Type locality: "John Day Valley" and "Baker County," Oregon. Collected by Howell and by Cusick.

Range: Eastern Oregon and Eastern Washington.

Specimens examined: Wenache, *Whited* 1041; Ellensburg, *Brandegee* 724; *Piper* 2716; *Whited* 618; White Salmon, *Suksdorf* 266; without locality, *Vasey* in 1889.

Zonal distribution: Upper Sonoran.

26. Phaca misera (Dougl.).

Astragalus miser Dougl.; Hook. Fl. Bor. Am. **1**: 153. 1830.

Astragalus microcystis A. Gray, Proc. Am. Acad. **6**: 220. 1865.

Type locality: "On low hills of the Spokane River, sixty miles from its confluence with the Columbia." Collected by Douglas.

Range: North Idaho and adjacent Washington and British Columbia.

Specimens examined: Fort Colville, *Lyall;* Old Fort Colville, *Watson* 90; Box Canyon, *Kreager* 396.

Zonal distribution: Arid Transition.

27. Phaca convallaria (Greene).

Astragalus convallarius Greene, Erythea **1**: 207. 1893.

Astragalus campestris A. Gray, Proc. Am. Acad. **6**: 229. 1865, not L. 1753.

Homalobus campestris Nutt.; Torr. & Gr. Fl. **1**: 351. 1838.

Type locality: "Sandy plains of the Colorado of the West, near the sources of the Platte."

Range: Washington to Montana and Colorado.

Specimens examined: Peshastin, *Sandberg & Leiberg*, August, July, 1893; Wenache, *Whited* 5, 211; Ophir, *Elmer* 528; Conconully, *Whited* 1309; Methow River, *Whited*, July 14, 1896; Beaver Creek, *Whited* 28; Ritzville, *Sandberg & Leiberg* 163; without locality, *Vasey*, in 1889.

Zonal distribution: Arid Transition.

28. Phaca decumbens (Nutt.).

Astragalus decumbens (Nutt.) A. Gray, Proc. Am. Acad. **6**: 229. 1865.

Homalobus decumbens Nutt.; Torr. & Gr. Fl. **1**: 352. 1838.

Type locality: "Sandy plains of the Colorado of the West, near the sources of the Platte " Collected by Nuttall.

Range: Washington to Montana and Colorado.

Specimens examined: Cascade Mountains to Fort Colville, latitude 49°, *Lyall* in 1860; near Spokane and Columbia Rivers, *Geyer* 475.

29. Phaca serotina (A. Gray).

Astragalus serotinus A. Gray, Pac. R. Rep. **12**^{2}: 51. 1860.

TYPE LOCALITY: "On the Okanogan, near the Columbia River," Washington. Collected by Cooper.

RANGE: Eastern Washington.

SPECIMENS EXAMINED: "On the Okanogan, near the Columbia River, Lat. 48°, Oct. *Cooper*"; Walla Walla Region, *Brandegee* 733; Ritzville, *Sandberg & Leiberg* 473, 163; Conconully, *Whited* 1309; without locality, *Vasey* 273; Loomis, *Griffiths & Cotton* 343.

ZONAL DISTRIBUTION: Arid Transition.

30. Phaca viridis (Nutt.).

Astragalus viridis (Nutt.) Sheldon, Minn. Bot. Stud. 1^3: 118. 1894.

Kentrophyta viridis Nutt.; Torr. & Gr. Fl. 353. 1838.

Kentrophyta montana Nutt.; Torr. & Gr. Fl. 353. 1838.

Astragalus kentrophyta A. Gray, Proc. Acad. Phila. **1863**: 60. 1863.

TYPE LOCALITY: "Hills of the Platte." Collected by Nuttall.

RANGE: South Dakota to New Mexico, Washington, and British America.

SPECIMENS EXAMINED: Walla Walla Region, *Brandegee* 734.

ASTRAGALUS LANOCARPUS Sheldon, Minn. Bot. Studies **1**: 144. 1894, was based on a plant collected by Joseph Howell in 1878 at Klickitat Prairie, Washington. We have not seen this species. It is a close ally of *A. purshii*, from which it is said to be distinguished by having narrow leaflets and stiff-hairy pods.

VICIA. VETCH.

Flowers in spikes or racemes on axillary peduncles.
Annuals; peduncles few-flowered; flowers very small, bluish-white .... 4. *V. hirsuta.*
Perennials; peduncles mostly many-flowered.
Flowers ochroleucous or tawny .... 3. *V. gigantea.*
Flowers violet or bluish-purple, rarely white.
Raceme 1-sided, densely 15 to 40-flowered .... 1. *V. cracca.*
Raceme loosely 5 to 20-flowered; leaflets ovate to oblong, acutish .... 2. *V. americana.*
Leaflets truncate .... 2a. *V. americana truncata.*
Leaflets linear .... 2a. *V. americana linearis.*
Flowers axillary, solitary or in twos, nearly sessile.
Leaflets oblong to ovate; pods brown .... 5. *V. sativa.*
Leaflets linear or linear-oblong; pods black .... 6. *V. angustifolia.*

1. Vicia cracca L. Sp. Pl. **2**: 735. 1753.

TYPE LOCALITY: Europe.

RANGE: British Columbia to Newfoundland, New Jersey, and Kansas.

SPECIMENS EXAMINED: Whatcom County, *Suksdorf* 965; *Gardner* 418.

2. Vicia americana Muhl.; Willd. Sp. Pl. **3**: 1096. 1801.

Vicia oregana Nutt.; Torr. & Gr. Fl. **1**: 270. 1838.

Vicia sparsifolia Nutt.; Torr. & Gr. Fl. **1**: 270. 1838.

TYPE LOCALITY: "Habitat in Pennsylvania."

RANGE: British Columbia to New York and southward to Mexico.

SPECIMENS EXAMINED: Montesano, *Heller* 3951; Challam County, *Elmer* 2534; Mason County, *Kincaid;* Olympia, *Kincaid;* Tacoma, *Flett* 897; west Klickitat County, *Suksdorf* 2014, 2122; North Yakima, *Mrs. Steinweg;* Wenache, *Whited* 150, 1266, 1080; Ellensburg, *Whited;* Cold Creek, *Cotton* 399; Sunnyside, *Cotton* 372; Little Spokane River, *Kreager* 599; Crab and Wilson Creeks, *Sandberg & Leiberg* 308; Almota, *Piper* 1486; Tukanon River, *Lake & Hull* 437; Loomis, *Griffiths & Cotton* 339.

ZONAL DISTRIBUTION: Upper Sonoran and Transition.

2a. Vicia americana truncata (Nutt.) Brewer in Brewer & Wats. Bot. Cal. **1**: 158. 1876.

Vicia truncata Nutt.; Torr. & Gr. Fl. **1**: 270. 1838.

TYPE LOCALITY: "Plains of the Oregon." Collected by Nuttall.

RANGE: Washington to California.

SPECIMENS EXAMINED: Seattle, *Piper;* Wenache, *Whited* 1080; without locality, *Vasey* in 1889.

2b. Vicia americana linearis (Nutt.) S. Wats. Proc. Am. Acad. **11**: 134. 1876.

Lathyrus linearis Nutt.; Torr. & Gr. Fl. **1**: 276. 1838.

TYPE LOCALITY: "Plains of the Platte."

RANGE: Washington to California and Wyoming.

SPECIMENS EXAMINED: Port Ludlow, *Binns*, May 20, 1889; west Klickitat County, *Suksdorf* 2013, 2111; Waitsburg, *Horner* 97.

3. Vicia gigantea Hook. Fl. Bor. Am. **1**: 157. 1830.

Vicia sitchensis Bong. Mem. Acad. St. Petersb. VI. **2**: 129. 1832.

TYPE LOCALITY: "Open woods on the Columbia." Collected by Scouler and by Douglas.

RANGE: Sitka to California in the coast region.

SPECIMENS EXAMINED: Montesano, *Heller* 3849; Clallam County, *Elmer* 2530; Olympia, *Henderson*, May, 1892; Fairhaven, *Suksdorf* 964; Tacoma, *Flett* 36; Cascades, *Suksdorf* 534.

ZONAL DISTRIBUTION: Humid Transition.

4. Vicia hirsuta (L.) Koch, Syn. Fl. Germ. 191. 1837.

Ervum hirsutum L. Sp. Pl. **2**: 738. 1753.

Vicia mitchelli Raf. Prec. Decouv. 37. 1814.

TYPE LOCALITY: European.

SPECIMENS EXAMINED: Tacoma, *Leckenby*, June, 1898; *Flett* 2225; Alki Point, *Piper* in 1889.

5. Vicia sativa L. Sp. Pl. **2**: 736. 1753. COMMON VETCH.

TYPE LOCALITY: European.

SPECIMENS EXAMINED: Clallam County, *Elmer* 2533; Whidby Island, *Gardner* 75; Cascades, *Suksdorf* 535.

6. Vicia angustifolia Roth, Tent. Fl. Germ. **1**: 310. 1788.

Vicia sativa angustifolia Ser. in DC. Prod. **2**: 361. 1825.

TYPE LOCALITY: "Habitat in campis sterilissimis, inter segetes arenosas totius fere Germaniae."

SPECIMENS EXAMINED: Seattle, *Piper*, July, 1895; Tacoma, *Flett* 214.

LATHYRUS. PEA.

Herbage densely silky-villous.................................... 1. *L. littoralis.*
Herbage glabrous, or if pubescent not villous.
Plants erect; tendrils wanting or much reduced.
Flowers solitary.................................... 2. *L. torreyi.*
Flowers 2 or more to each raceme.
Corolla white; leaflets usually 3 pairs, oblong or ovate.................................... 3. *L. obovatus.*
Corolla purple.
Stems tall; leaflets 4 to 7 pairs.
Leaflets oblong to ovate, pubescent beneath.......................... 4. *L. nuttallii.*
Leaflets lanceolate, pubescent on both sides.......................... 5. *L. oregonensis.*
Stems low; leaflets 1 or 2 pairs.

Leaflets elliptic to obovate........... 6. *L. bijugatus.*
Leaflets linear to lanceolate.......... 6a. *L. bijugatus sandbergii.*
Plants climbing by simple or 3-forked tendrils.
Stems winged.................................. 7. *L. paluster.*
Stems wingless.
Flowers yellowish becoming tawny............ 8. *L. sulphureus.*
Flowers blue-purple.
Leaflets very thin, 5 to 8 pairs........... 9. *L. polyphyllus.*
Leaflets firm, 3 to 6 pairs.
Peduncles not exceeding the leaves; leaflets not cuspidate.
Leaflets ovate-oblong, glabrous... 10. *L. maritimus.*
Leaflets linear-lanceolate or elliptic, pubescent................. 11. *L. coriaceus.*
Peduncles exceeding the leaves; leaflets cuspidate.
Leaflets oblong or elliptic........ 12. *L. pauciflorus.*
Leaflets linear or lanceolate...... 12a. *L. pauciflorus tenuior.*

1. Lathyrus littoralis (Nutt.) Endl.; Walp. Repert. **1**: 722. 1842.

Astrophia littoralis Nutt.; Torr. & Gr. Fl. **1**: 278. 1838.

Orobus littoralis A. Gray, Pac. R. Rep. **4**: 54. 1859.

TYPE LOCALITY: "Sand hills near the estuary of the Oregon." Collected by Nuttall.

RANGE: On the seacoast of Washington and Oregon.

SPECIMENS EXAMINED: Laidlaw, *Lamb* 1119; Shoalwater Bay, *Cooper;* Whidby Island, *Gardner* 82; Ocosta, *Henderson*, June, 1892; without locality, *Wilkes Expedition.*

ZONAL DISTRIBUTION: Humid Transition.

2. Lathyrus torreyi A. Gray, Proc. Am. Acad. **7**: 337. 1868.

Lathyrus torreyi tenellus Wiegand, Bull. Torr. Club **26**: 135. 1899.

TYPE LOCALITY: Mendocino or south part of Humboldt County, California.

RANGE: Washington to California west of the Cascades.

SPECIMENS EXAMINED: Tacoma, *Flett*, June, 1897, 180; Steilacoom, *Cooper*; Puyallup, *Piper* 3826; La Camas, *Henderson*, May 30, 1889; Manor, *Piper* 3075.

ZONAL DISTRIBUTION: Humid Transition.

3. Lathyrus obovatus (Torr.) White, Bull. Torr. Club **21**: 455. 1894.

Lathyrus venosus obovatus Torr. Pac. R. Rep. **4**: 77. 1857.

Lathyrus nevadensis S. Wats. Proc. Am. Acad. **11**: 133. 1876.

TYPE LOCALITY: "Mammoth Grove and Duffield's Ranch, California."

RANGE: Washington to California.

SPECIMENS EXAMINED: Waitsburg, *Horner* 93.

3a. Lathyrus obovatus stipulaceus White, Bull. Torr. Club **21**: 455. 1894.

TYPE LOCALITY: Colville to Spokane, Washington. Collected by the Wilkes Expedition.

RANGE: British Columbia and Washington.

SPECIMENS EXAMINED: Spokane Valley, *Lyall* in 1861.

4. Lathyrus nuttallii S. Wats. Proc. Am. Acad. **21**: 450. 1886.

TYPE LOCALITY: "Upper California." Collected by Nuttall.

RANGE: British Columbia to California in the coast region.

SPECIMENS EXAMINED: Olympic Mountains, *Henderson* 2349; Cascade Mountains, latitude 49°, *Lyall* in 1859; Cascade Mountains, *Henderson* 2346; Admiralty Head, *Piper;* Seattle, *Hindshaw;* upper Nisqually Valley, *Allen* 297; Klickitat County, *Henderson*, June 1, 1884; Klickitat River, *Flett* 1261; Falcon Valley, *Suksdorf* 354; Lake Wenache, *Sandberg*

& Leiberg 634; Clealum, *Whited* 364, 365; without locality, *Vasey* in 1889; La Camas, *Gorman*, June, 1884.

ZONAL DISTRIBUTION: Transition.

The *L. myrtifolius* Muhl. of Suksdorf's list is based on a specimen that we do not hesitate to refer to *L. nuttallii.*

5. **Lathyrus oregonensis** White, Bull. Torr. Club **21**: 456. 1894.

TYPE LOCALITY: Oregon. Collected by Cusick.

RANGE: Eastern Washington and eastern Oregon.

SPECIMENS EXAMINED: Falcon Valley, *Suksdorf* 536.

6. **Lathyrus bijugatus** White, Bull. Torr. Club **21**: 457. 1894.

TYPE LOCALITY: Latah County, Idaho. Collected by Sandberg.

RANGE: Washington and Idaho.

SPECIMENS EXAMINED: Spokane County, *Suksdorf* 1824; Spokane, *Wilkes Expedition* 572; Hangman Creek, *Sandberg & Leiberg* 24; Pullman, *Elmer* 214.

ZONAL DISTRIBUTION: Arid Transition.

6a. **Lathyrus bijugatus sandbergii** White, Bull. Torr. Club **21**: 457. 1894.

Lathyrus sandbergii Howell, Fl. N. W. Am. 1:160. 1898.

TYPE LOCALITY: Latah County, Idaho.

RANGE: Idaho and adjacent Washington.

SPECIMENS EXAMINED: Spokane Valley, *Lyall* in 1861; Pullman, *Elmer* 830; *Piper* 1488, and June, 1894.

ZONAL DISTRIBUTION: Arid Transition.

7. **Lathyrus paluster** L. Sp. Pl. **2**: 733. 1753.

Lathyrus occidentalis Nutt.; Torr. & Gr. Fl. 1:276. 1838, as synonym.

TYPE LOCALITY: Europe.

RANGE: Alaska to Labrador, south to California and New York. Europe.

SPECIMENS EXAMINED: San Juan Island, *Lyall* in 1858; latitude 49° boundary, *Lyall* in 1858-59; Whidby Island, *Gardner* 91; Seattle, *Piper* 726; *Smith;* Yakima River, *Henderson* 2347; Everett, *Piper* 4916.

ZONAL DISTRIBUTION: Humid Transition.

8. **Lathyrus sulphureus** Brewer; A. Gray, Proc. Am. Acad. **7**: 399. 1868.

TYPE LOCALITY: "In woods along foot hills of Sierra Nevada," California. Collected by Brewer.

RANGE: Washington to California west of the Cascades and Sierras.

SPECIMENS EXAMINED: Seattle, *Piper* 482; Olympia, *Henderson* 2348; Loomis, *Griffiths & Cotton* 337.

ZONAL DISTRIBUTION: Transition.

This species seems too close to *L. ochroleucus* Hook.

9. **Lathyrus polyphyllus** Nutt.; Torr. & Gr. Fl. **1**: 274. 1838.

TYPE LOCALITY: "Forests of the Oregon to the sea." Collected by Nuttall.

RANGE: British Columbia to north California in the coast region.

SPECIMENS EXAMINED: Clallam County, *Elmer* 2535; Seattle, *Piper* 481; Tacoma, *Flett*, May, 1895; west Klickitat County, *Suksdorf* 2021.

ZONAL DISTRIBUTION: Humid Transition.

10. **Lathyrus maritimus** (L.) Bigel. Fl. Bost. ed. 2. 268. 1824.

Pisum maritimum L. Sp. Pl. **2**: 727. 1753.

TYPE LOCALITY: Europe.

RANGE: Seacoasts, Labrador to New Jersey, and Alaska to Oregon; shores of the Great Lakes.

Specimens examined: South Arbor, *Lamb* 1112; Fairhaven, *Piper*, July 2, 1897; Coupeville, *Gardner* 87; Port Ludlow, *Binns*, September 15, 1890; Fidalgo Island, *Lyall* in 1858; Bellingham Bay, *Suksdorf* 1823; Everett, *Piper*, July 9, 1892; Clallam County, *Elmer* 2528.

Zonal distribution: Humid Transition.

11. Lathyrus coriaceus White, Bull. Torr. Club **21**: 452. 1894.

Type locality: Wasatch Mountains, Utah.

Range: Washington to Arizona.

Specimens examined: Seattle, *O. Piper*; Wenache, *Whited* 148; Ellensburg, *Piper* 2720; *Whited*, July 9, 1897; Toppenish and Tampico, *Henderson* 2345; Toppenish, *Henderson* in 1892; North Yakima, *Leckenby*; base Mount Adams, *Flett* 1260, 1260a; Klickitat River, *Henderson* 2344; Wenache, *Griffiths & Cotton* 147; Wenas, *Griffiths & Cotton* 106; Clealum Lake, *Cotton* 843; Kittitas Valley, *Cotton* 1208.

Zonal distribution: Upper Sonoran.

12. Lathyrus pauciflorus Fernald, Bot. Gaz. **19**: 335. 1894.

Lathyrus parvifolius S. Wats. Proc. Am. Acad. **17**: 345. 1882, not Roth. 1797.

Lathyrus shaffneri Rydberg, Mem. N. Y. Bot. Gard. **1**: 258. 1900.

Type locality: Roseburg, Oregon.

Range: Washington and Idaho to California and Mexico.

Specimens examined: Nisqually Valley, *Allen* 132; west Klickitat County, *Suksdorf* in 1886; Ellensburg, *Piper* 2679; Wenache Region, *Brandegee* 735; Wenache, *Whited* 1106; Waitsburg, *Horner* 96; Wawawai, *Piper*, June 13, 1896; *Lake & Hull*, June 4, 1892; Almota, *Piper* 2797 and May 27, 1893.

Zonal distribution: Upper Sonoran and Arid Transition.

Suksdorf's specimens were distributed and later listed as *L. polymorphus* Nutt., a species that does not reach our borders.

12a. Lathyrus pauciflorus tenuior Piper, Fl. Palouse Reg. 108. 1901.

Type locality: Near Almota, Washington.

Range: Eastern Washington.

Specimens examined: West Klickitat County, *Suksdorf*, April 23, 1886; Wenache, *Whited* 127, 150, 2, 1107; Waitsburg, *Horner* 95; Almota, *Elmer* 52; Union Flat, *Piper* 2733; without locality, *Vasey* in 1889; Wenas, *Griffiths & Cotton* 86; Wenache Mountains, *Griffiths & Cotton* 129.

Zonal distribution: Arid Transition and Upper Sonoran.

Lathyrus venosus Muhl. Suksdorf lists this species, but we can discover no good evidence that it occurs in the State.

GERANIACEAE. Geranium Family.

Leaves palmate, variously cleft or divided .... Geranium (p. 378).
Leaves pinnately compound (in ours) .... Erodium (p. 380).

GERANIUM.

Perennials; flowers large .... 1. *G. viscosissimum*.
Annuals; flowers small.
Seeds reticulate or pitted.
Flowers deep purple; seeds pitted .... 4. *G. dissectum*.
Flowers pale purple; seeds reticulately ridged.
Peduncles short; inflorescence compact .... 2. *G. carolinianum*.
Peduncles long; inflorescence loose .... 3. *G. bicknellii*.
Seeds smooth or nearly so.
Carpels canescent, not rugose .... 5. *G. pusillum*.
Carpels glabrous, rugose .... 6. *G. molle*.

1. **Geranium viscosissimum** Fisch. & Mey. Ind. Sem. Hort. Petrop. **11**: Suppl. 18. 1846.

Geranium albiflorum incisum Torr. & Gr. Fl. **1**: 206. 1838.

Geranium incisum Nutt.; Torr. & Gr. Fl. **1**: 206. 1838, as synonym, not Andrews, Bot. Rep. **1**: *pl. 67*. 1797.

TYPE LOCALITY: "Hab. in America septentrionalis occidentali."

RANGE: British Columbia to Saskatchewan, southward to California and Utah.

SPECIMENS EXAMINED: Rock Lake, *Sandberg & Leiberg* 106; Fort Colville, *Lyall* in 1860; Spokane, *Suksdorf* 262; Pullman, *Hull* 451; *Piper* 1646; Blue Mountains, *Piper* 2399; Rattlesnake Mountains, *Cotton* 467; Tieton River, *Cotton* 457; Clarks Springs, *Kreager* 25; Sprague, *Henderson*, May 30, 1892; Colville Reservation, *Griffiths & Cotton* 409; Squaw Creek, *Cotton* 881; Easton, *Piper*.

ZONAL DISTRIBUTION: Arid Transition.

Besides the typical form there are two others, one slender and canescent represented by *Cotton's* 881 from Squaw Creek, the other densely short-pubescent represented by *Whited*, Wenache, June, 1896; North Yakima, *Leckenby*, May 12, 1898, and Toppenish, *Henderson*, May 28, 1892. The latter especially seems to be a good subspecies of Upper Sonoran habitat.

2. **Geranium carolinianum** L. Sp. Pl. **2**: 682. 1753.

TYPE LOCALITY: Carolina.

RANGE: Throughout the United States and in Canada.

SPECIMENS EXAMINED: Fairhaven, *Piper*, July, 1897; Cascade Mountains, latitude 49°, *Lyall* in 1859; Beaver Creek, *Whited* 25, 66; west Klickitat County, *Suksdorf* 2027; Marshall Junction, *Piper* 2260; Almota, *Piper* 1828; Wawawai, *Piper* 1813; without locality, *Vasey* in 1889; Clarks Springs, *Kreager* 132; Loon Lake, *Beattie & Chapman* 2098.

ZONAL DISTRIBUTION: Upper Sonoran and Transition.

3. **Geranium bicknellii** Britton, Bull. Torr. Club **24**: 92. 1897.

Geranium carolinianum longipes S. Wats. Bot. King Explor. 50. 1871, not *Geranium longipes* DC. 1822.

Geranium nemorale Suksdorf, Deutsch. Bot. Monats. **16**: 222. 1898.

TYPE LOCALITY: "Nova Scotia? Maine to western Ontario and southern New York."

RANGE: British Columbia to Nova Scotia, southward to California, Colorado, and New York.

SPECIMENS EXAMINED: Seattle, *Piper* 41, 591; Vancouver, *J. Howell* 422; west Klickitat County, *Suksdorf* 2028; Fort Colville to Cascade Mountains, *Lyall* in 1860; Ophir, *Elmer* 527; Spokane, *Dewart*, June 5, 1901; Blue Mountains, *Piper*, August 2, 1896; *Lake & Hull*, July 4, 1892; Ione, *Kreager* 406; Clallam County, *Elmer* 2726; Cape Horn, *Piper* 5003.

ZONAL DISTRIBUTION: Transition.

4. **Geranium dissectum** L. Amoen. Acad. **4**: 282. 1759.

TYPE LOCALITY: "Habitat in Europa australiore."

RANGE: Vancouver Island to California; introduced from Europe.

SPECIMENS EXAMINED: Lake Union, *Suksdorf* 1993; Tacoma, *Flett* 50.

5. **Geranium pusillum** Burm. f. Spec. Bot. Ger. 27. 1759.

TYPE LOCALITY: Not ascertained.

SPECIMENS EXAMINED: Seattle, *Smith* 40; *Piper*, July, 1895; Tacoma, *Flett* 81; Vancouver, *J. Linell* 21; Pullman, *Hardwick*, July, 1895; Stuart Island, *Lawrence*, 176, 180.

6. **Geranium molle** L. Sp. Pl. **2**: 682. 1753.

TYPE LOCALITY: European.

SPECIMENS EXAMINED: Stuart Island, *Lawrence* 55.

ERODIUM.

1. **Erodium cicutarium** (L.) L'Her.; Ait. Hort. Kew **2**: 414. 1789. ALFILARIA.
Geranium cicutarium L. Sp. Pl. **2**: 680. 1753.
TYPE LOCALITY: "Habitat in Europae sterilibus cultis."
SPECIMENS EXAMINED: Olympic Mountains, *J. M. Grant* in 1889; Rattlesnake Mountains, *Cotton* 337; Spokane, *Lyall* in 1861; Pullman, *Piper*, May, 1894; *Hull* 452; Clarks Springs, *Kreager* 103, 573; Priest Rapids, *Cotton* 1389.
This plant has been common in western Washington for at least thirty years.

OXALIDACEAE.

OXALIS.

Caulescent; flowers yellow.. 1. *O. pumila.*
Acaulescent; flowers white.
  Scapes 1-flowered; capsule ovoid................................ 2. *O. oregana.*
  Scapes several-flowered; capsule linear .... 3. *O. trilliifolia.*

1. **Oxalis pumila** Nutt.; Torr. & Gr. Fl. **1**: 212. 1838.
Oxalis suksdorfii Trelease, Mem. Bost. Soc. Nat. Hist. **4**: 89. 1888.
TYPE LOCALITY: "Forests of the Rocky Mountains and Oregon."
RANGE: Washington to middle California.
SPECIMENS EXAMINED: Five miles north of Vancouver, *Piper* 4939.
ZONAL DISTRIBUTION: Humid Transition.
Nuttall's statement that this occurs in the Rocky Mountains is surely an error.

2. **Oxalis oregana** Nutt.; Torr. & Gr. Fl. **1**: 211. 1838.
TYPE LOCALITY: "Shady woods of the Oregon in moist places." Collected by Nuttall.
RANGE: Washington to California in the coast region.
SPECIMENS EXAMINED: Montesano, *Henderson*, June, 1892; Skokomish Valley, *Kincaid*, May, 1892; upper Nisqually Valley, *Allen* 84; *Piper* 2097; Tacoma, *Flett* 98; Cape Horn, *Suksdorf* 2451; Ilwaco, *Piper* 4959.
ZONAL DISTRIBUTION: Humid Transition and Canadian.

3. **Oxalis trilliifolia** Hook. Fl. Bor. Am. **1**: 118. 1830.
TYPE LOCALITY: "North-West America, on the summits of the high mountains near the Grand Rapids of the river Columbia; and also in the vallies of the Rocky Mountains." Collected by Douglas.
RANGE: Washington and Oregon in the coast region.
SPECIMENS EXAMINED: Upper Nisqually Valley, *Allen* 85; Longmire Springs, *Piper* 2096; Puyallup, *Flett*, August, 1897; Larm River, *Suksdorf* 106.
ZONAL DISTRIBUTION: Canadian.
As this species is known only west of the Cascade Mountains, the latter part of Douglas's type locality is doubtless an error.

LINACEAE. FLAX FAMILY.

LINUM.

Flowers large, blue.
  Annual; stigmas as long as the styles.............................. 1. *L. usitatissimum.*
  Perennial; stigmas short.. 2. *L. lewisii.*
Flowers small, yellow; annual.. 3. *L. digynum.*

1. **Linum usitatissimum** L. Sp. Pl. **1**: 277. 1753. COMMON FLAX.
TYPE LOCALITY: European.
SPECIMENS EXAMINED: Pullman, *Piper*, July, 1895; Meyers Falls, *Kreager* 476.

2. **Linum lewisii** Pursh, Fl. **1**: 210. 1814.
Linum lyallanum Alefeld, Bot. Zeit. **25**: 251. 1867.

Type locality: "In the valleys of the Rocky Mountains and on the banks of the Missouri." Collected by Lewis.

Range: Washington to Hudson Bay, southward to Texas and California.

Specimens examined: Klickitat Valley, *Lyall* in 1860; Ellensburg, *Whited* 428, 685; Rattlesnake Mountains, *Cotton* 424; near Leavenworth, *Whited*, August, 1896; Pasco, *Hindshaw* 47; Wenas River, *Henderson*, June, 1892; Ritzville, *Sandberg & Leiberg* 198; Parrots, *Lake & Hull*, August 5, 1892; Pullman, *Piper* 1648; *Hull* 760; *Elmer* 814.

Zonal distribution: Arid Transition.

This species was formerly confused with *L. perenne* L.

3. **Linum digynum** A. Gray, Proc. Am. Acad. **7**: 334. 1868.

Type locality: "Mariposa Trail, Yosemite Valley," California.

Range: Washington to California.

Specimens examined: Spangle, *Suksdorf* 261; Pullman, *Piper* 1803.

Zonal distribution: Arid Transition.

EUPHORBIACEAE. Euphorbia Family.

Flowers involucrate; capsule 3-celled.. Euphorbia.
Flowers not involucrate; capsule 1-celled, 1-seeded .... Piscaria.

EUPHORBIA.

Glands of the involucre bearing petal-like appendages; plants prostrate or nearly so.
  Herbage pubescent; seeds black.................................. 3. *E. maculata.*
  Herbage glabrous; seeds gray.
    Seeds with sharp transverse ridges.......................... 1. *E. glyptosperma.*
    Seeds pitted and wrinkled.................................. 2. *E. serpyllifolia.*
Glands of the involucre not bearing petal-like appendages; stems erect.
  Leaves filiform, very numerous; seeds smooth.................. 5. *E. cyparissias.*
  Leaves not filiform nor very numerous; seeds not smooth.
    Seeds pitted; leaves entire, oblong or obovate.............. 4. *E. peplus.*
    Seeds reticulated; leaves serrulate, spatulate................ 6. *E. arkansana.*

1. **Euphorbia glyptosperma** Engelm. in Torr. Bot. Mex. Bound. 187. 1859.
Euphorbia polygonifolia L. err. det. Hook. Fl. Bor. Am. **2**: 140.

Type locality: "Canada (*Pursh*) to Carlton House Fort on the Saskatchewan. *Drummond.* On Menzies Island and at the Grand Rapids of the Columbia. *Douglas.*"

Range: British Columbia to Canada, south to California, Texas, and Mexico.

Specimens examined: Columbia Valley, *Lyall*, June, 1860; White Salmon, *Suksdorf* 489; White Bluff Ferry, *Lake & Hull* 641; Wenache, *Whited* 197, 1154; North Yakima, *Watt*, August, 1895; Peshastin, *Sandberg & Leiberg* 472; Lake Chelan, *Lake & Hull* 642; Almota, *Piper* 1816; Wawawai, *Piper* 1893, August, 1894; Meyers Falls, *Kreager*, August 21, 1902; Marcus, *Kreager* 461.

Zonal distribution: Upper Sonoran and Arid Transition.

2. **Euphorbia serpyllifolia** Pers. Syn. Pl. **2**: 14. 1807.

Type locality: "Hab. in Amer. calidiore."

Range: Washington to Wisconsin, south to Mexico.

Specimens examined: Tacoma, *Flett* 25; Loomis, *Elmer* 602; Pullman, *Piper* 1543; Yelm Prairie, *Piper* in 1888.

Zonal distribution: Transition.

2a. Euphorbia serpyllifolia consanguinea Boiss. in DC. Prod. **15^2**: 43. **1862.**

Type locality: Ad lacum Winnipeg (Bourgeau), in valle Missouri superioris (Neuwied), territ. Nebraska (Hayden), Novo Mexico (Wright, Fendler), Kansas et Texas (ex Engelm.) California (Engelm.).

Range: Washington to Saskatchewan, Texas, and California.

Specimens examined: West Klickitat County, *Suksdorf* 210.

3. Euphorbia maculata L. Sp. Pl. **1**: 455. 1753.

Type locality: "Habitat in America septentrionali."

Range: Most of temperate North America.

Specimens examined: Meyers Falls, *Kreager*, August 25, 1902.

4. Euphorbia peplus L. Sp. Pl. **1**: 456. 1753.

Type locality: European.

Specimens examined: East Seattle, *Hindshaw*, June, 1897.

5. Euphorbia cyparissias L. Sp. Pl. **1**: 461. 1753.

Type locality: "Habitat in Misnia, Bohemia, Helvetia, G. Narbonensi."

Specimens examined: Pullman, *Piper*, June, 1897.

6. Euphorbia arkansana missouriensis Norton, Rep. Mo. Bot. Gard. **11**: **103. 1900.**

Type locality: Randolph, Missouri.

Range: Washington to Minnesota, Kansas, and New Mexico.

Specimens examined: Walla Walla Region, *Brandegee* 1072; Almota, *Lake & Hull* 641; Wawawai, *Elmer* 758.

Zonal distribution: Upper Sonoran.

Euphorbia platyphylla L. This European species was reported by Hooker[a] from the "plains of the Columbia River," collected by Douglas, but there is no recent evidence of such occurrence.

PISCARIA.

1. Piscaria setigera (Hook.)

Eremocarpus setigerus Benth. Bot. Sulph. 53. *pl. 26.* 1844.

Croton? setigerus Hook. Fl. Bor. Am. **2**: 141. 1838.

Type locality: "Plentiful on Menzies' Island, and on sandy banks of the Columbia upwards." Collected by Douglas.

Range: Washington to California.

Specimens examined: Bingen, *Piper*, September, 1903; Granddalles, *Westgate* 927.

Zonal distribution: Arid Transition.

As pointed out by Coville,[b] Eremocarpus was first used for a genus of Hypericaceae by Reichenbach in 1837, and is therefore not available for our plant. The new name is given in allusion to the use of the plant by the Indians to stupefy fish by throwing quantities of it in the streams. It is rather strange that the plant should first have been found at the extreme northern point of its range.

CALLITRICHACEAE. Water Starwort Family.

CALLITRICHE.

Leaves all submersed, linear, 1-nerved .... 1. *C. palustris.*
Floating leaves obovate-spatulate, 3-nerved.
    Styles about as long as the fruit .... 2. *C. verna.*
    Styles twice as long as the fruit .... 3. *C. bolanderi.*

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[a] Fl. Bor. Am. **2**: 140. 1838.

[b] Contr. Nat. Herb. **4**: 194. 1893.

1. **Callitriche palustris** L. Sp. Pl. **2**: 969. 1753.
Callitriche autumnalis L. Fl. Suec. ed. 2. 2. 1755.
Type locality: "Habitat in Europae fossis paludibus."
Range: British Columbia to Oregon, Colorado, and Canada. Europe.
Specimens examined: Lake Cushman, *Henderson* 1862; mouth of the Columbia, *Scouler*.

2. **Callitriche verna** L. Fl. Suec. ed. 2. 2. 1755.
Type locality: European.
Range: Temperate regions of America, Europe, and Asia.
Specimens examined: Hoquiam, *Lamb* 1012; North Yakima, *Piper* 1797; Mount Rainier, *Allen* 185; Pullman, *Piper*, July 28, 1899.

3. **Callitriche bolanderi** Hegelm. Verh. Bot. Verein Brandenb. **10**: 116. 1868.
Type locality: Auburn, California.
Range: Vancouver Island to California.
Specimens examined: Clallam County, *Elmer* 2779; Lake Cushman, *Piper* 2236; Seattle, *Piper*, July 12, 1895; Usk, *Kreager* 352; Tacoma, *Flett* 2262.

EMPETRACEAE. Crowberry Family.

EMPETRUM.

1. **Empetrum nigrum** L. Sp. Pl. **2**: 1022. 1753. Crowberry.
Type locality: European.
Range: Arctic regions southward to Maine, Michigan, and Washington. Europe. Asia
Specimens examined: Mount Rainier, *Piper* 2051; *Smith* 1100; Copalis, *Conard* 409.

LIMNANTHACEAE. Buckbean Family.

FLOERKEA.

1. **Floerkea proserpinacoides** Willd. Neue Schrift. Ges. Naturf. Fr. Berlin **3**: 449. 1801.
Floerkea occidentalis Rydberg, Mem. N. Y. Bot. Gard. **1**: 208. 1900.
Type locality: "In Pennsylvanien."
Range: Washington to Ontario southward to California, Utah, and Pennsylvania.
Specimens examined: Ellensburg, *Piper*, May 21, 1897; Klickitat River, *Flett* 1018; without locality, *Wilkes Expedition*.
Zonal distribution: Transition.

ANACARDIACEAE. Cashew Family.

RHUS.

Fruit red, pubescent; leaflets 11 to 31 .... 1. *R. glabra*.
Fruit white, glabrous; leaflets 3.
    Leaflets mostly subentire, the lateral ones petioled .... 2. *R. toxicodendron*.
    Leaflets mostly crenate, the lateral ones sessile .... 3. *R. diversiloba*.

1. **Rhus glabra occidentalis** Torr. Bot. Wilkes Exped. 257. 1874. Sumac.
Rhus occidentalis Blankinship, Mont. Agr. Coll. Sci. Stud. **1**: 86. 1905.
Type locality: "Banks of rivers, near Fort Okanagan and Fort Vancouver; also on the Kooskooskee."
Range: British Columbia to Montana and Oregon.
Specimens examined: Near Wenache, *Whited* 56; Columbus, *Suksdorf* 2454; Morgans Ferry, *Suksdorf* 265; Columbia River, *Lyall* in 1860; Rock Island, *Sandberg & Leiberg* 429; Almota, *Lake & Hull* 448; Wawawai, *Lake & Hull* 448; *Elmer* 872; *Piper* 1654; Waitsburg,

Horner 393; without locality, *Vasey* 213; Clarks Springs, *Kreager* 121; Spokane, *Kreager* 552; Prosser, *Cotton* 622; Kiona, *Cotton* 729.

ZONAL DISTRIBUTION: Upper Sonoran.

2. Rhus toxicodendron L. Sp. Pl. **1**: 266. 1753. POISON IVY.

Rhus rydbergii Small, Mem. N. Y. Bot. Gard. **1**: 268. 1900.

TYPE LOCALITY: "Habitat in Virginia, Canada."

RANGE: British Columbia to Nova Scotia, southward to Arizona and Florida.

SPECIMENS EXAMINED: Wenache, *Whited* 241; Yakima, *Leckenby*, June, 1898; west Klickitat County, *Suksdorf* 263; Spokane, *Henderson*, July, 1892; Hangman Creek, *Suksdorf* 264; Wawawai, *Lake* 447; Spokane, *Kreager* 538; without locality, *Vasey* in 1889.

ZONAL DISTRIBUTION: Upper Sonoran.

The western plant seems never to climb trees or walls, but is a low, erect, or decumbent shrub. Without better distinctions than this we see no reason for considering it a distinct species, as has been done by Small.

Professor Greene, however, not only considers *R. rydbergii* Small as well founded, but proposes three additional new species for Washington plants under the generic name Toxicodendron,[a] namely, *T. hesperium*, founded on Whited's 241, *T. lobadioides*, and *T. coriaceum*, the two latter founded on specimens collected by Suksdorf.

3. Rhus diversiloba Torr. & Gr. Fl. **1**: 218. 1838. POISON OAK.

Rhus lobata Hook. Fl. Bor. Am. **1**: 127. 1830, not Poir. 1804.

TYPE LOCALITY: "Oregon." Collected by Douglas.

RANGE: Washington to California in the coast regions.

SPECIMENS EXAMINED: Orchard Point, *Piper*, July, 1895; Seattle, *Piper* in 1887; Union City, *Piper* in 1900; Tacoma, *Flett* 141.

ZONAL DISTRIBUTION: Humid Transition.

"RHUS AROMATICA Ait. var." Suksdorf thus lists a species of the occurrence of which in Washington there is no direct evidence. *Rhus trilobata* occurs in southern Oregon, but probably does not reach Washington.

CELASTRACEAE. STAFFTREE FAMILY.

Stamens 4 or 5, as many as the petals and sepals.
  Deciduous shrub; flowers 5-merous .... EUONYMUS.
  Evergreen shrub; flowers 4-merous .... PACHISTIMA.
Stamens 10; flowers 5-merous .... FORSELLESIA.

EUONYMUS.

1. Euonymus occidentalis Nutt.; Torr. Pac. R. Rep. **4**: 74. 1856.

TYPE LOCALITY: "Oregon in dark woods." Collected by Nuttall.

RANGE: Washington to California and Nevada.

SPECIMENS EXAMINED: Seven miles east of Vancouver, *Gorman* in 1905.

PACHISTIMA.

1. Pachistima myrsinites (Pursh) Raf. Fl. Tellur. 42. 1838.

Ilex? myrsinites Pursh, Fl. **1**: 119. 1814.

Myginda myrtifolia Nutt. Gen. **1**: 109. 1818.

Oreophila myrtifolia Nutt.; Torr. & Gr. Fl. **1**: 259. 1838.

TYPE LOCALITY: "On the Rocky Mountains and near the Pacific Ocean." Collected by Lewis. The exact spot in the Rocky Mountains is on the Lolo Trail near Hungry [Lolo] Creek, North Idaho.

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[a] Greene, Leaflets **1**: 118 120. 1905.

RANGE: British Columbia to California and New Mexico.

SPECIMENS EXAMINED: Near Seattle, *Piper*, June, 1892; Tacoma, *Flett* 97; upper Nisqually Valley, *Allen* 106; along Twisp River, *Whited* 201; Stevens Pass, *Sandberg & Leiberg* 742; Wenache Mountains, *Whited* 1335; Skamania County, *Suksdorf* 2452; Cascade Mountains, latitude 49°, *Lyall* in 1859; Columbia Valley, *Lyall* in 1860; Lake Chelan, *Lake & Hull* 761; Blue Mountains, *Horner* 428; Olympic Mountains, *Elmer* 2752; Mount Carlton, *Kreager* 286.

ZONAL DISTRIBUTION: Canadian and Transition.

FORSELLESIA.

1. **Forsellesia spinescens** (A. Gray) Greene, Erythea 1: 206. 1893.

Glossopetalon spinescens A. Gray, Pl. Wright. 2: 29. *pl. 12.* 1853.

TYPE LOCALITY: "In a mountain ravine near Frontera, New Mexico."

RANGE: Washington to California and Texas.

SPECIMENS EXAMINED: Whitman County, Washington, near Lewiston, *Hunter* 46.

ZONAL DISTRIBUTION: Upper Sonoran.

ACERACEAE. MAPLE FAMILY.

ACER. MAPLE.

Flowers in racemes; fruit hispid .... 1. *A. macrophyllum.*
Flowers in corymbs; fruit glabrous.
  Leaves 3 to 5-lobed; fruit wings somewhat spreading .... 2. *A. douglasii.*
  Leaves 7 to 9-lobed; fruit wings widely spreading .... 3. *A. circinatum.*

1. **Acer macrophyllum** Pursh, Fl. 1: 267. 1814. OREGON MAPLE.

TYPE LOCALITY: "On the great rapids [Cascades] of the Columbia River." Collected by Lewis.

RANGE: British Columbia to California in the coast region.

SPECIMENS EXAMINED: Tacoma, *Flett* 42; Nisqually Valley, *Allen* 114; Silverton, *Bouck* 39; Peshastin, *Sandberg & Leiberg* 501; Peshastin Canyon, *Watson;* Lake Chelan, *Lake & Hull* 450; Bingen, *Suksdorf* 35; without locality, *Vasey* 225, 226; Clallam County, *Elmer* 2836; Stehekin, *Griffiths & Cotton* 219.

ZONAL DISTRIBUTION: Humid Transition.

2. **Acer douglasii** Hook. Lond. Journ. Bot. 6: 77. *pl. 6.* 1847.

Acer glabrum douglasii Piper, Fl. Palouse Reg. 114. 1901.

TYPE LOCALITY: "Near springs of the Rocky Mountains about the sources of the Columbia." Collected by Douglas.

RANGE: Blue Mountains, Oregon, northeastward into west Montana and northwestward to British Columbia.

SPECIMENS EXAMINED: Skagit Pass, *Lake & Hull* 449; Nisqually Valley, *Allen* 212; Mount Rainier, *Piper* 52; Mount Adams, *Henderson*, July, 1892; Cleman Mountain, *Henderson*, June, 1892; Wenache Mountains, *Whited* 1022; Tampico, *Flett* 1200; Hoodsport, *Piper* 1017; Fort Colville, *Lyall* in 1860; Sprague, *Sandberg & Leiberg* 156; Blue Mountains, *Piper*, August, 1892; without locality, *Vasey* 229, 230; Davis ranch, *Kreager* 311; Wenas, *Griffiths & Cotton* 96.

ZONAL DISTRIBUTION: Transition and Canadian.

3. **Acer circinatum** Pursh, Fl. 1: 267. 1814. VINE MAPLE.

TYPE LOCALITY: "On the great rapids [Cascades] of the Columbia River." Collected by Lewis.

RANGE: British Columbia to California in the coast region.

SPECIMENS EXAMINED: Near Montesano, *Heller* 3859; Grays Harbor, *Lamb* 1034a; Tacoma, *Flett* 41; upper Nisqually Valley, *Allen* 115; Silverton, *Bouck* 38; Yakima Pass, *Watson* 73; White Salmon, *Suksdorf* 261; Cascade Mountains, latitude 49°, *Lyall* in 1859; Stehekin, *Whited* 1408; Nason Creek, *Sandberg & Leiberg* 624; without locality, *Vasey* 227, 228; Clallam County, *Elmer* 2835; Stehekin, *Griffiths & Cotton* 221.

ZONAL DISTRIBUTION: Humid Transition.

IMPATIENTACEAE. BALSAM FAMILY.

IMPATIENS. JEWELWEED.

Posterior sepal not spurred.. 1. *I. ecalcarata.*
Posterior sepal spurred.
  Corolla orange-yellow; saccate sepal longer than broad............. 2. *I. biflora.*
  Corolla pale-yellow; saccate sepal much longer than broad.......... 3. *I. nolitangere.*

1. **Impatiens ecalcarata** Blankinship, Mont. Agr. Coll. Sci. Stud. **1**: 85. 1905.

TYPE LOCALITY: Montana, "about half a mile east of Plains, Missoula County."

RANGE: Washington to Montana.

SPECIMENS EXAMINED: Columbia Valley, *Lyall* in 1860.

2. **Impatiens biflora** Walt. Fl. Car. 219. 1788.

Impatiens fulva Nutt. Gen. **1**: 146. 1818.

Impatiens aurella Rydberg, Bull. Torr. Club **28**: 34. 1901.

TYPE LOCALITY: Carolina.

RANGE: Washington to Newfoundland, south to Kansas and Mississippi.

SPECIMENS EXAMINED: Columbia Valley, *Lyall* in 1860; Wilbur, *Henderson*, July, 1892; Rock Lake, *Lake & Hull* 453; Spokane, *Piper* 2384; Spokane County, *Suksdorf* 1837; Meyers Falls, *Kreager* 472.

3. **Impatiens nolitangere** L. Sp. Pl. **2**: 938. 1753.

TYPE LOCALITY: "Habitat in Europae, Canadae nemoribus."

RANGE: Alaska to Washington. Europe. Asia.

SPECIMENS EXAMINED: Cascade Mountains, latitude 49°, *Lyall* in 1859; Deming, *Flett* 853; North Fork of Nooksack River, *Suksdorf* 960.

ZONAL DISTRIBUTION: Canadian.

This species is undoubtedly native, not introduced as indicated in the Synoptical Flora.

RHAMNACEAE. BUCKTHORN FAMILY.

Fruit a drupe; flowers solitary or umbelled.............................. RHAMNUS.
Fruit a dry capsule; flowers paniculate.................................. CEANOTHUS.

RHAMNUS.

Shrub; petals wanting; leaves nearly glabrous beneath .. .. 1. *R. alnifolia.*
Tree; petals present; leaves downy beneath.......................... 2. *R. purshiana.*

1. **Rhamnus alnifolia** L'Her. Sert. Angl. 5. 1788.

TYPE LOCALITY: "In America septentrionale."

RANGE: British Columbia to Maine, southward to California, Wyoming, and New Jersey.

SPECIMENS EXAMINED: Marshall Junction, *Piper* 2250; near Spangle, *Suksdorf* 2453; Box Canyon, *Kreager* 393.

ZONAL DISTRIBUTION: Canadian.

2. **Rhamnus purshiana** DC. Prod. **2**: 25. 1825. CASCARA SAGRADA.

Rhamnus alnifolia Pursh, Fl. **1**: 166. 1814. Not L'Her.

TYPE LOCALITY. "On the banks of the Kooskooskee" [Clearwater], Idaho. The exact spot where Lewis collected the type is Camp Chopunish, opposite Kamiah.

RANGE: British Columbia to Idaho and California.

Specimens examined: Montesano, *Heller* 3885; Sumas Prairie, *Lyall* in 1858; upper Nisqually Valley, *Allen* 126; Columbia River, latitude 46° to 49°, *Lyall* in 1860; Lake Chelan, *Lake & Hull* 445; Pullman, *Piper* 1871; Blue Mountains, *Piper*, July, 1896; Wawawai, *Piper* 3817, 3816; without locality, *Vasey* 215, 216; without locality, *Cooper* 1854; Spokane, *Kreager* 554; Clallam County, *Elmer* 2661.

Zonal distribution: Transition and Upper Sonoran.

CEANOTHUS.

Leaves opposite, dentate; procumbent shrub .... 1. *C. prostratus.*
Leaves alternate; erect shrubs.
    Evergreen; leaves varnished .... 2. *C. velutinus.*
    Deciduous; leaves serrate; flowers white .... 3. *C. sanguineus.*
    Deciduous; leaves subentire; flowers usually blue .... 4. *C. integerrimus.*

1. **Ceanothus prostratus** Benth. Pl. Hartw. 302. 1848.

Type locality: "In montibus Sacramento," California.

Range: Washington to California.

Specimens examined: Falcon Valley, *Suksdorf* 644, 343; Klickitat Valley, *Howell*, May, 1878; Klickitat County, *Brandegee* 693.

2. **Ceanothus velutinus** Dougl.; Hook. Fl. Bor. Am. **1**: 125. 1830. Sticky Laurel.

Type locality: "Subalpine hills near the source of the Columbia; and at the Kettle Falls." Collected by Douglas. The latter locality is in Stevens County, Washington.

Range: Washington to California, Colorado, and Dakota.

Specimens examined: Wenache Mountains, *Whited* 1109; Cedar Mountains, *Elmer* 800; Tacoma, *Flett* 173; Falcon Valley, *Suksdorf* 962; Clealum, *Henderson*, June, 1892; *Whited* 406; Peshastin, *Sandberg & Leiberg* 477; Kettle Falls, *Douglas;* Kamiak Butte, *Sandberg, Heller & MacDougal* 501; Columbia River, *Lyall* in 1860; without locality, *Vasey* 221; Box Canyon, *Kreager* 387; Clealum Lake, *Cotton* 859.

Zonal distribution: Transition.

The Sandberg, Heller, & MacDougal specimen has been published as *C. velutinus laevigatus* Torr. & Gr.,[a] but it is better referred to the species.

3. **Ceanothus sanguineus** Pursh, Fl. **1**: 167. 1814. Buckbrush.

Ceanothus oreganus Nutt.; Torr. & Gr. Fl. **1**: 265. 1838.

Type locality: "Rocky Mountains on the banks of the Missouri." Collected by Lewis.

Range: British Columbia to Idaho and California.

Specimens examined: Olympia, *Henderson*, May, 1892; Nisqually Valley, *Allen* 111; Wenache Mountains, *Whited*, June 23, 1901 and 1233; Falcon Valley, *Suksdorf* 107; Manor, *Piper*, July 14, 1899; Vancouver, *Piper*, July 14, 1899; Trout Lake, *Flett* 1208; Cascade Mountains, latitude 49°, *Lyall;* Nason Creek, *Sandberg & Leiberg* 628; Kamiak Butte, *Piper*, July 20, 1899; Blue Mountains, *Lake & Hull*, July, 1892; Easton, *Whited* 403; Clallam County, *Elmer* 2659, 2660.

Zonal distribution: Transition.

The actual type specimen of this species is probably the sheet from the Lambert Herbarium, now in the Philadelphia Academy of Sciences. This is labeled "*Ceanothus atropurpureus.* Near the foot of the Rocky Mountains on Collins Creek, June 27, 1806." Collins Creek is in Idaho, now known as Lolo Creek.

4. **Ceanothus integerrimus** Hook. & Arn. Bot. Beech. Voy. 329. 1839–40.

Type locality: California.

Range: Washington to California.

Specimens examined: West Klickitat County, *Suksdorf* 10; Dalles [on the Washington side?] *Lyall, Suckley;* Bingen, *Piper*, September, 1903.

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[a] Contr. Nat. Herb. **3**: 218. 1895.

According to Dr. E. L. Greene[a] the type of *C. integerrimus* proves to be the same as *C. andersonii* Parry. On this account the name *C. nevadensis* Kellogg is taken up for the Californian plant, while the Washington and northern Oregon plant is considered a distinct species *C. peduncularis* Greene.[b]

MALVACEAE. MALLOW FAMILY.

Style branches filiform.
  Stamens simply monadelphous; bractlets 3........................ MALVA.
  Stamens united in two series; bractlets none........................ SIDALCEA.
Style branches each tipped with a capitate stigma.
  Ovules 1 to 3 in each cell, ascending............................. SPHAERALCEA.
  Ovules solitary, pendulous.................................... SIDA.

MALVA.

Leaves 5 to 9-lobed; carpels puberulent.......................... 1. *M. rotundifolia.*
Cauline leaves dissected; carpels very hairy........................ 2. *M. moschata.*

1. Malva rotundifolia L. Sp. Pl. **2**: 688. 1753. MALLOW.

TYPE LOCALITY: "Habitat in Europae ruderatis, viis, plateis."

SPECIMENS EXAMINED: North Yakima, *Watt*, August, 1895; Colfax, *Hardwick*, August, 1895; Meyers Falls, *Kreager*, August 28, 1902; Port Crescent, *Lawrence* 294.

2. Malva moschata L. Sp. Pl. **2**: 690. 1753. MUSK MALLOW.

TYPE LOCALITY: "Habitat in Italia, Gallia."

SPECIMENS EXAMINED: Montesano, *Heller* 4030; Puyallup, *Piper*, September, 1895.

MALVA BOREALIS Wallm. is included by Suksdorf in his list. We have seen no Washington specimens.

SIDALCEA.

Flowers red; mature carpels smooth.............................. 1. *S. hendersonii.*
Flowers pink; mature carpels rugose.
  Calyx canescent; stems puberulent.......................... 2. *S. oregana.*
  Calyx pubescent; stems hirsute............................. 3. *S. campestris.*

1. Sidalcea hendersonii S. Wats. Proc. Am. Acad. **23**: 262. 1888.

TYPE LOCALITY: Clatsop Bay, Oregon. Collected by Henderson.

RANGE: Seacoast, Vancouver Island to Oregon.

SPECIMENS EXAMINED: Whidby Island, *Gardner*, 58; Hoquiam, *Lamb* 1218; near Everett, *Claypool*, September, 1895; Seattle, *Piper* 723; Everett, *Piper* 4915.

ZONAL DISTRIBUTION: Humid Transition.

2. Sidalcea oregana A. Gray, Pl. Fendl. 20. 1848.

Sida oregana Nutt.; Torr. & Gr. Fl. **1**: 234. 1838.

TYPE LOCALITY: "West side of the Rocky Mountains." Collected by Nuttall.

RANGE: Idaho and Washington to California.

SPECIMENS EXAMINED: Skamania County, *Suksdorf* 2418; Falcon Valley, *Suksdorf*, July 20, 1886, and 2446; west Klickitat County, *Suksdorf* 2447, 2449; Klickitat River, *Flett* 1014; Ellensburg, *Whited* 486; Tieton River, *Cotton* 458; Coulee City, *Lake & Hull*, August, 1892; *Henderson* 2433; Blue Mountains, near Waitsburg, *Piper* 2396; Cow Creek, *Griffiths & Cotton* 534.

ZONAL DISTRIBUTION: Arid Transition.

The plant listed by Suksdorf as "*S. spicata* Greene?" seems to be referable to *S. oregana*.

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[a] Leaflets 1: 65. 1904.

[b] Leaflets 1: 67. 1904.

3. **Sidalcea campestris** Greene, Bull. Cal. Acad. 1: 76. 1885.
Sidalcea asplenifolia Greene, Pittonia 3: 158. 1897.
TYPE LOCALITY: Oregon. Collected by Howell.
RANGE: British Columbia to California.
SPECIMENS EXAMINED: North Yakima, *Watt,* August, 1895; Wenas River, *Henderson,* June 17, 1892, 2436; between Wenache and Ellensburg, *Whited,* August 13, 1896; Peshastin, *Sandberg & Leiberg* 586; Pullman, *Piper* 1644, 1645; *Lake & Hull* 428; *Henderson* 2434; Union Flat, *Hull* 428; Medical Lake, *Henderson,* July 12, 1892; Seattle, *Piper.*
ZONAL DISTRIBUTION: Transition.

SPHAERALCEA.

Flowers scarlet; leaves canescent .... 1. *S. munroana.*
Flowers rose-red; leaves not canescent.
    Calyx lobes acute; pedicels short .... 2. *S. rivularis.*
    Calyx lobes long-acuminate; pedicels long .... 3. *S. longisepala.*

1. **Sphaeralcea munroana** (Dougl.) Spach, Hist. Veg. 3: 353. 1834.
Malva munroana Dougl.; Lindl. Bot. Reg. 16: *pl. 1306.* 1830.
TYPE LOCALITY: "Upon the barren plains of the Columbia." Collected by Douglas.
RANGE: British Columbia to Nevada and Wyoming.
SPECIMENS EXAMINED: Wenache, *Whited* 1120; *Elmer* 526; North Yakima, *Piper* 1819; *Watt,* August, 1895; *Mrs. Steinweg* in 1894; near Yakima River, *Suksdorf* 259; Columbia River, latitude 46° to 49°, *Lyall;* Snipes Mountain, *Cotton* 390; Prosser, *Henderson,* May, 1892; Pasco, *Hindshaw* 3; *Piper* 2991; between Coulee City and Waterville, *Spillman,* May, 1896; Wilson Creek, *Lake & Hull* 759; junction Crab and Wilson Creek, *Sandberg & Leiberg* 276; Coulee City, *Piper* 3846; Soap Lake, *McKay* 9; Washtucna, *Elmer* 1040; opposite mouth Wenache, *Watson,* October 14, 1880.
ZONAL DISTRIBUTION: Upper Sonoran.

2. **Sphaeralcea rivularis** (Dougl.) Torr. in A. Gray, Pl. Fendl. 23. 1848.
Malva rivularis Dougl.; Hook. Fl. Bor. Am. 1: 107. 1830.
Sphaeralcea acerifolia Nutt.; Torr. & Gr. Fl. 1: 228. 1838.
TYPE LOCALITY: "Common on the banks in North-West America, from the ocean to the Rocky Mountains." Collected by Douglas.
RANGE: British Columbia to Dakota and Nevada.
SPECIMENS EXAMINED: Columbia River, latitude 43° to 49°, *Lyall* in 1860; Mount Adams, *Flett* 1015; Columbus, *Suksdorf,* June 10, 1886; Naches Valley, *Henderson,* June, 1892; Wenache, *Whited* 225; Meyers Falls, *Kreager* 600; Rock Lake, *Lake & Hull,* 427; Almota, *Piper* 1790; Wawawai, *Piper* 1643; Blue Mountains, *Piper* 2413; *Lake & Hull* 427; Guy, *Elmer* 42; Pullman, *Piper,* July 15, 1901.
ZONAL DISTRIBUTION: Upper Sonoran and Arid Transition.

3. **Sphaeralcea longisepala** Torr. Bot. Wilkes Exped. 255. 1874.
TYPE LOCALITY: "Upper Columbia, Washington Territory." Collected by the Wilkes Expedition.
RANGE: Kittitas and Chelan counties, Washington.
SPECIMENS EXAMINED: Rock Island, *Sandberg & Leiberg* 430; Wenache Mountains, *Whited* 1291; banks of Columbia near mouth of Wenache, *Tweedy* 918; *Brandegee* 692.
ZONAL DISTRIBUTION: Upper Sonoran.

SIDA.

1. **Sida hederacea** (Dougl.) Torr. in A. Gray, Pl. Fendl. 23. 1848.
Malva hederacea Dougl.; Hook. Fl. Bor. Am. 1: 107. 1830.
Malva plicata Nutt.; Torr. & Gr. Fl. 1: 227. 1838.
Sida obliqua Nutt.; Torr. & Gr. Fl. 1: 233. 1838.

TYPE LOCALITY: "In the interior districts of the Columbia." Collected by Douglas.

RANGE: Washington to California and Texas.

SPECIMENS EXAMINED: Walla Walla, *Douglas*, according to Hooker.

It is not certain that this species really occurs in Washington limits, though the above specimen was apparently collected by Douglas at old Fort Walla Walla.

HYPERICACEAE. St. JOHNSWORT FAMILY.

HYPERICUM. St. JOHNSWORT.

Plants low, forming dense mats.
  Alpine; leaves crowded; flowers solitary .... 2. *H. bryophytum.*
  Not alpine; leaves not crowded; flowers often several .... 1. *H. anagalloides.*
Plants erect, simple or nearly so.
  Stamens 5 to 10; stems about 30 cm. high .... 3. *H. canadense.*
  Stamens numerous; stems tall.
    Sepals acuminate; capsule not lobed .... 4. *H. perforatum.*
    Sepals obtuse; capsule 3-lobed .... 5. *H. scouleri.*

1. Hypericum anagalloides Cham. & Schlecht. Linnaea **3**: 127. 1828.

TYPE LOCALITY: San Francisco, California.

RANGE: British Columbia to California and Montana.

SPECIMENS EXAMINED: Seattle, *Piper* in 1885; Woodlawn, *Henderson*, June 22, 1892; Montesano, *Heller* 3916.

ZONAL DISTRIBUTION: Humid Transition.

1a. Hypericum anagalloides nevadense Greene, Fl. Fran. 113. 1891.

TYPE LOCALITY: "Foothills of the Sierra."

RANGE: Washington to California.

SPECIMENS EXAMINED: Pullman, *Piper* 2650.

2. Hypericum bryophytum Elmer, Bot. Gaz. **36**: 60. 1903.

TYPE LOCALITY: Olympic Mountains, Clallam County, Washington. Collected by Elmer.

RANGE: Mountains of Washington.

SPECIMENS EXAMINED: Olympic Mountains, *Elmer* 2833; Big Creek Prairie, *Lamb* 1399; Cascade Mountains, latitude 49°, *Lyall* in 1859; Bridge Creek, *Elmer*, September, 1897; Horseshoe Basin, *Lake & Hull* 783; Mount Rainier, *Piper*, August, 1895; upper Nisqually Valley, *Allen* 117; Nason Creek, *Sandberg & Leiberg* 607; without locality, *Vasey* in 1889.

ZONAL DISTRIBUTION: Arctic.

3. Hypericum canadense majus A. Gray, Man. ed. 5. 86. 1867.

TYPE LOCALITY: Lake Superior.

RANGE: Washington to New Brunswick, south to Texas and Georgia.

SPECIMENS EXAMINED: Green Lake, *Piper* 1115.

4. Hypericum perforatum L. Sp. Pl. **2**: 785. 1753.

TYPE LOCALITY: European.

SPECIMENS EXAMINED: Vancouver, *Suksdorf*; *Piper*, July 14, 1890.

5. Hypericum scouleri Hook. Fl. Bor. Am. **1**: 111. 1830.

Hypericum formosum scouleri Coult. Bot. Gaz. **11**: 108. 1886.

TYPE LOCALITY: "Abundant in dry gravelly soils and limestone rocks on the North-West coast of America, near the Columbia." Collected by Scouler and by Douglas.

RANGE: British Columbia to Arizona and New Mexico.

SPECIMENS EXAMINED: Tacoma, *Flett* 120, 90; North Yakima, *Watt*, August, 1895; Montesano, *Heller* 4037; Columbus, *Suksdorf*, June 10, 1886; Columbia River, *Lyall* in

1860; Egbert Springs, *Sandberg & Leiberg* 361; Wenache, *Whited* 1253; Ellensburg, *Whited* 499; Tieton River, *Cotton* 454; Muckleshoot, *Dr. Ruhn*; Seattle, *Piper* in 1885; Mission, *Kreager* 486; valley of Columbia below the Chelan, *Watson*, October 14, 1880; without locality, *Vasey* in 1889; Pullman, *Elmer* 880; *Piper* 1653; *Hull* 656; Tukanon River, *Lake & Hull*, July, 1892; Rattlesnake Mountains, *Cotton* 693; Clealum Lake, *Cotton* 853.

Zonal distribution: Upper Sonoran and Transition.

ELATINACEAE. Waterwort Family.

Plants glabrous; flowers parts 2 to 4 .... Elatine.
Plants pubescent; flower parts 5 .... Bergia.

ELATINE.

Flower parts 2 or 3; seeds nearly straight .... 1. *E. triandra.*
Flower parts 4; seeds strongly curved .... 2. *E. californica.*

1. **Elatine triandra** Schkuhr, Handb. **1**: 345. *pl. 109b. f. 2.* 1791.

Type locality: Germany.

Range: Illinois, Nebraska, Wyoming, Washington. Europe.

Specimens examined: Usk, *Kreager* 367.

2. **Elatine californica** A. Gray, Proc. Am. Acad. **13**: 361, 364. 1878.

Type locality: "In Sierra Valley, on the Sierra Nevada, alt. 5000 feet," California. Collected by Lemmon.

Range: Washington to California.

Specimens examined: Spokane County, *Suksdorf* 258; Spokane, *Piper* 2643.

Zonal distribution: Arid Transition.

BERGIA.

1. **Bergia texana** (Hook.) Seub.; Walp. Repert. **1**: 285. 1842.

Merimea texana Hook. Ic. **3**: *pl. 278.* 1840.
Elatine texana Torr. & Gr. Fl. **1**: 678. 1840.

Type locality: Texas. Collected by Drummond.

Range: Washington to California and Texas.

Specimens examined: West Klickitat County, *Suksdorf* 959, 618; Almota, *Piper*, September, 1897.

Zonal distribution: Upper Sonoran.

VIOLACEAE. Violet Family.

VIOLA. Violet.

- Acaulescent.
  - Flowers small, white .... 1. *V. macloskeyi.*
  - Flowers larger, violet.
    - Lateral petals bearded at base; rootstocks thick.
      - Plants not stoloniferous; stipules small.
        - Herbage glabrous .... 2. *V. nephrophylla.*
        - Herbage hirsute or villous .... 3. *V. cuspidata.*
      - Plants stoloniferous; stipules large .... 4. *V. langsdorfii.*
    - Lateral petals beardless; rootstocks long and slender .... 5. *V. palustris.*
- Caulescent.
  - Flowers yellow.
    - Stems prostrate, stolon-like; leaves evergreen.
      - Leaves cordate; leafy branches producing petaliferous flowers .... 6. *V. sempervirens.*

Leaves reniform; leafy branches producing only cleistogamous flowers.................................. 7. *V. orbiculata.*
Stems erect, not stoloniferous; leaves not evergreen.
Leaves palmately dissected.......................... 11. *V. sheltonii.*
Leaves not dissected.
Herbage pubescent; leaves lanceolate to ovate, subentire.................................. 8. *V. nuttallii.*
Herbage glabrous.
Leaves ovate, veined, sinuate-dentate or lobed.. 9. *V. venosa.*
Leaves cordate or reniform, acuminate........ 10. *V. glabella.*
Flowers blue or violet.
Leaves dissected into narrow lobes.......................... 12. *V. trinervata.*
Leaves cordate, not dissected.
Stipules scarious, entire.
Leaves cordate, acuminate.......................... 13. *V. canadensis.*
Leaves reniform, obtuse.......................... 14. *V. flettii.*
Stipules herbaceous, at least some of them serrate or incised.
Leaves usually brown-dotted, at least beneath; stipules all serrate or laciniate.
Herbage glabrous or nearly so................ 16. *V. adunca.*
Herbage pubescent, the pubescence retrorse... 17. *V. retroscabra.*
Leaves dotless; cauline stipules entire............. 15. *V. howellii.*

1. Viola macloskeyi Lloyd, Erythea **3**: 74. 1895.
TYPE LOCALITY: "In the Cascades, Oregon."
RANGE: British Columbia to Oregon.
SPECIMENS EXAMINED: Seattle, *Piper*; Tacoma, *Flett* 108, 2222; Olympia, *Henderson* 2054.
ZONAL DISTRIBUTION: Humid Transition.
This species has commonly been referred to *V. blanda* Willd., but it seems distinct.

2. Viola nephrophylla Greene, Pittonia **3**: 144. 1896.
Viola cognata Greene, Pittonia **3**: 145. 1896.
Viola subjuncta Greene, Pittonia **5**: 31. 1902.
TYPE LOCALITY: "Valley of the Cimarron River, western Colorado."
RANGE: British Columbia to Saskatchewan and Maine, south to Colorado.
SPECIMENS EXAMINED: Admiralty Head, *Piper*, May, 1898; Columbus, *Suksdorf*, April 13, 1886; Ellensburg, *Piper*, May 21, 1897; North Yakima, *Piper* 1836; *Henderson* 2500; Rock Lake, *Piper* 2798; Medical Lake, *Sandberg & Leiberg* 56.
ZONAL DISTRIBUTION: Arid Transition.

3. Viola cuspidata Greene, Pittonia **3**: 314. 1898.
TYPE LOCALITY: Rock County, Wisconsin.
RANGE: Washington to Wisconsin.
SPECIMENS EXAMINED: Pend Oreille River, *Lyall* in 1861.

4. Viola langsdorfii Fischer; DC. Prod. **1**: 296. 1824.
TYPE LOCALITY: "In insula Unalaschka."
RANGE: Alaska to Oregon.
SPECIMENS EXAMINED: Port Crescent, *Lawrence* 273.

5. Viola palustris L. Sp. Pl. **2**: 934. 1753.
TYPE LOCALITY: European.
RANGE: Alaska to Labrador, southward to Colorado and the White Mountains. Europe. Asia.

Specimens examined: Clallam County, *Elmer* 2794; Olympic Mountains, *Piper*, August, 1895; Cascade Mountains, latitude 49°, *Lyall* in 1858; Seattle, *Piper* 1017; Tacoma, *Flett* 88; Nisqually Valley, *Allen* 57; Westport, *Lamb* 1097; Mount Adams, *Suksdorf* July 12, 1886; Klickitat County, *Suksdorf* in 1878; Silverton, *Bouck* 25; Wenache Mountains, *Elmer* 442; Mount Rainier, *Flett* 2178.

Zonal distribution: Humid Transition to Hudsonian.

6. Viola sempervirens Greene, Pittonia **4**: 8. 1899.

Viola sarmentosa Dougl.; Hook. Fl. Bor. Am. **1**: 80. 1830, not Bieb. 1808–1819.

Type locality: "Near Fort Vancouver and in the high grounds of Lewis and Clarks River, N. W. America." Collected by Douglas.

Range: British Columbia to California in the coast region.

Specimens examined: Montesano, *Heller* 3888; Seattle, *Piper* in 1885; Silverton, *Bouck* 25; Whidby Island, *Piper*, April, 1898; upper Nisqually Valley, *Allen* 56; without locality, *Henderson*, May, 1892; Walla Walla, *Nuttall*.

Zonal distribution: Humid Transition.

7. Viola orbiculata Geyer; Hook. Lond. Journ. Bot. **6**: 73. 1847.

Viola sarmentosa orbiculata A. Gray, Syn. Fl. **1**: 199. 1895.

Type locality: Coeur d'Alene Mountains, Idaho. Collected by Geyer.

Range: Idaho and adjacent Washington.

Specimens examined: Blue Mountains, *Horner* 60; Usk, *Kreager* 369.

Zonal distribution: Arid Transition and Canadian.

8. Viola nuttallii Pursh, Fl. **1**: 174. 1814.

Viola linguaefolia Nutt.; Torr. & Gr. Fl. **1**: 141. 1838.

Type locality: "On the banks of the Missouri."

Range: British Columbia and Saskatchewan to California and Colorado.

Specimens examined: West Klickitat County, *Suksdorf* 248; Fort Vancouver, *Tolmie*; without locality, *Cooper*; near Fort Colville, *Lyall* in 1861; Spokane Valley, *Lyall* in 1861; Roy, *Allen*, May 6, 1889; Waterville, *Whited* 1216; Pullman, *Hull* 418; Spangle, *Suksdorf* 248.

Zonal distribution: Arid Transition.

A very variable species and possibly, as here accepted, a complex of several. More field study and abundant specimens are necessary to clear up this matter.

8a. Viola nuttallii praemorsa (Dougl.).

Viola praemorsa Dougl. Bot. Reg. **15**: *pl. 1254*. 1829.

Type locality: "On the banks of the Columbia, and the plains of the River Aguilar, in California." Collected by Douglas.

Range: Washington to California in the coast region.

Specimens examined: Whidby Island, *Gardner* 30; Tacoma, *Flett* 17.

8b. Viola nuttallii major Hook. Fl. Bor. Am. **1**: 79. 1830.

Viola glareosa Dougl.; Hook. loc. cit. as synonym.

Viola flavovirens Pollard, Bull. Torr. Club **24**: 405. 1897.

Type locality: "Abundant under the shade of pines on the dry sandy plains of the Columbia." Collected by Douglas.

Specimens examined: Blue Mountains, *Horner* 58; Spokane, *Sandberg & Leiberg* 47; near Almota, *Piper* 1715; Ellensburg, *Whited*, April 18, 1897.

9. Viola venosa (S. Wats.).

Viola aurea venosa S. Wats. in Brewer & Wats. Bot. Cal. **1**: 56. 1876.

Viola nuttallii venosa S. Wats. Bot. King. Explor. 35. 1871.

Viola praemorsa venosa A. Gray, Syn. Fl. **1**: 200. 1895.

Type locality: "In the mountains from the West Humboldt to the Wahsatch, usually near the snow line."

Range: Washington to Nevada and California.

Specimens examined: Mount Stuart, *Brandegee* 648; Klickitat County, *Suksdorf* in 1878; Falcon Valley, *Suksdorf*, May 9, 1886; Klickitat River, *Flett* 1063; Blue Mountains, *Piper* 2432.

Zonal distribution: Hudsonian.

10. Viola glabella Nutt.: Torr. & Gr. Fl. **1**: 142. 1838.

Type locality: "Shady woods of the Oregon." Collected by Nuttall.

Range: Alaska to California and Idaho.

Specimens examined: Clallam County, *Elmer* 2796; Silverton, *Bouck* 27; Paradise Valley, *Flett* 290; upper Nisqually Valley, *Allen* 55; Skokomish Valley, *Kincaid*, May 11, 1892; west Klickitat County, *Suksdorf*, June 24, 1886; Wenache Mountains, *Whited* 1244; Columbia woods, *Nuttall*; Pend Oreille River, *Lyall* in 1861; without locality, *Cooper*; Mount Carlton, *Kreager* 204, 253; Blue Mountains, *Piper*, July 15, 1896; Ilwaco, *Piper* 4918.

Zonal distribution: Canadian, rarely Transition.

11. Viola sheltoni Torr. Pac. R. Rep. **4**: 67 1856.

Type locality: Yuba, California.

Range: Washington to California.

Specimens examined: White Salmon Valley, *Suksdorf* 5.

12. Viola trinervata Howell: A. Gray, Bot. Gaz. **11**: 290. 1886.

Viola beckwithii trinervata Howell, Bot. Gaz. **8**: 207. 1883.

Viola chrysantha glaberrima Torr. Bot. Wilkes Exped. 238. 1874, not *Viola hastata glaberrima* Ging. 1824.

Type locality: Near Goldendale, Washington.

Range: Central Washington.

Specimens examined: Goldendale, *Howell* 59; Ellensburg, *Whited* 264; North Yakima, *Watt* in 1892; *Piper*, April, 1903; *Henderson*, May 27, 1892; Kittitas Mountain, *Whited* 10; Klickitat, *Howell*, April, 1882, 1878; North Yakima, *Nevius*, March, 1889; Simcoe Mountains, *Suksdorf* 249; between Spipen and Columbia, *Pickering & Brackenridge*; Klickitat River, *Flett* 1062; Waterville, *Whited* 1215; Coulee City, *Piper* 3865.

Zonal distribution: Upper Sonoran.

13. Viola canadensis L. Sp. Pl. **2**: 936. 1753.

Viola geminiflora, Greene, Pittonia **5**: 29. 1902.

Type locality: Canada.

Range: Washington to Newfoundland, south to Arizona and Carolina.

Specimens examined: Nason Creek, *Sandberg & Leiberg* 672.

14. Viola flettii Piper, Erythea **6**: 69. 1898.

Type locality: Near Mount Constance, Olympic Mountains, Washington. Collected by Flett.

Range: Olympic Mountains.

Specimens examined: Olympic Mountains, *Flett* 106, July 20, 1897, August, 1898; *Henderson* 1847; Mount Elinor, *Jennie V. Getty*, August, 1902.

Zonal distribution: Hudsonian.

15. Viola howellii A. Gray, Proc. Am. Acad. **22**: 308. 1887.

Viola subcordata Greene, Pittonia **3**: 316. 1898.

Type locality: "Damp fir woods in the vicinity of Portland, Oregon." Collected by Howell.

Range: British Columbia to Oregon west of the Cascade Mountains.

Specimens examined: Coupeville, *Gardner* 28, 29; Seattle, *Piper* 1020; *Meany* 237; Tacoma, *Flett* 80, 107; Coupeville, *Gardner* 31; Olympia, *Henderson*, May 24, 1892; Olympic Mountains, *Piper*, August, 1895.

Zonal distribution: Humid Transition.

16. Viola adunca Smith; Rees' Cycl. **37**: no. 63. 1817.
Viola longipes Nutt.; Torr. & Gr. Fl. **1**: 140. 1838.
Viola canina adunca A. Gray; Proc. Am. Acad. **8**:377. 1872.

Type locality: "From the west coast of North America." Collected by Menzies.

Range: Alaska to California and Arizona.

Specimens examined: Clallam County, *Elmer* 2795; Orcas Island, *Lyall* 1861; Muckleshoot, *Dr. Ruhn;* Seattle, *Smith*, May 3, 1889; Mount Rainier, *Piper* 2138 in part; Montesano, *Heller* 3928; Westport, *Lamb* 1102; Rockland, *Suksdorf*, April 10, 1858; Klickitat River, *Flett* 1061; Falcon Valley, *Suksdorf* 522; Roy, *Allen*, May 3, 1889; White Bluff Ferry, *Lake & Hull*, August 10, 1892; Yakima, *Leckenby*, April 22. 1898; *Mrs. Steinweg;* Ellensburg, *Whited* 274, 346, 366; Badger Mountain, *Whited* 1217; Fort Colville, *Lyall* 1861; Spangle, *Suksdorf* 246; without locality, *Vasey* 202; Rock Creek, *Piper* 2795; Spokane, *Piper*, May 8, 1898, 2824; *Sandberg & Leiberg* 33; Pullman, *Piper* 1714, *Elmer* 123, *Hull* 417; Waitsburg, *Horner* 55, 54.

Zonal distribution: Upper Sonoran to Hudsonian.

A very variable species. The alpine forms especially are aberrant and perhaps constitute a different species.

16a. Viola adunca oxyceras (S. Wats.)
Viola canina oxyceras S. Wats. in Brewer & Wats. Bot. Cal. **1**: 56. 1876.

Type locality: "In the Sierra Nevada, in Yosemite Valley, and near Donner Pass."

Range: Washington to California.

Specimens examined: North Yakima, *Henderson* 2501.

17. Viola retroscabra Greene, Pittonia **4**: 290. 1901.

Type locality: Southern Colorado.

Range: Washington and Montana to Colorado.

Specimens examined: Olympic Mountains, *Piper*, August, 1895; Mount Rainier, *Piper* 2138 in part; *Allen*, July, 1892; Methow River, *Whited* 185; Klickitat River, *Suksdorf* 523; Stevens Pass, *Sandberg & Leiberg* 739.

Zonal distribution: Hudsonian.

Viola tricolor L., the garden pansy occasionally occurs as an escape.

Viola hallii Gray, listed by Suksdorf, probably does not grow within our limits.

LOASACEAE. Loasa Family.

MENTZELIA.

Biennials; flowers large; placentae with 2 rows of ovules, which are separated by horizontal lamellae.
  Petals 2.5 to 3 cm. long; capsule 1.5 cm. long .... 1. *M. brandegei.*
  Petals 5 to 6 cm. long; capsules 3 cm. long .... 2. *M. laevicaulis.*
Annuals; flowers small; placentae each with a single row of ovules; no horizontal lamellae.
  Leaves pinnatifid; seeds tuberculate, the angles obtuse .... 3. *M. albicaulis.*
  Leaves not pinnatifid; seeds not tuberculate.
    Seeds nearly smooth with grooved angles; leaves ovate, entire or sinuate-dentate .... 4. *M. integrifolia.*
    Seeds sharply angled and pitted; leaves linear, entire .... 5. *M. tenerrima.*

1. Mentzelia brandegei S. Wats. Proc. Am. Acad. **20**: 367. 1885.

Type locality: "Near the Simcoe Mountains on the mesa bordering Satus Creek." Washington. Collected by Brandegee.

Range: Known only by the type collection.

Specimens examined: Without locality, *Brandegee* 792.

2. **Mentzelia laevicaulis** (Dougl.) Torr. & Gr. Fl. **1**: 535. 1840.
Bartonia laevicaulis Dougl.; Hook. Fl. Bor. Am. **1**: 221. 1833.
?*Bartonia parviflora* Dougl. loc. cit.
TYPE LOCALITY: "On the gravelly islands and rocky shores of the Columbia, near the 'Great Falls;' flowering in June and July." Collected by Douglas.
RANGE: Washington to California and Utah.
SPECIMENS EXAMINED: West Klickitat County, *Suksdorf* 1679; Wenache, *Whited* 24; North Yakima, *Watt*, August, 1895; Parker, *Cotton* 433; Coulee City, *Lake & Hull* 439; Egbert Springs, *Sandberg & Leiberg* 378; Spokane, *Piper*, September, 1896, July, 1894; Loon Lake, *Winston*, July 20, 1897; Waitsburg, *Horner* 312; without locality, *Vasey* in 1889; Almota, *Piper*, August, 1894; Lake Kalispel, *Kreager* 329; Prosser, *Cotton* 808; Moses Lake, *Cotton* 611.
ZONAL DISTRIBUTION: Arid Transition and Upper Sonoran.

3. **Mentzelia albicaulis** Dougl.; Hook. Fl. Bor. Am. **1**: 222. 1833.
Bartonia albicaulis Dougl.; Hook. Fl. Bor. Am. **1**: 222. 1833.
TYPE LOCALITY: "On arid sandy plains of the river Columbia." Collected by Douglas.
RANGE: Washington to California, Nebraska, and New Mexico.
SPECIMENS EXAMINED: Wenache, *Whited* 1122; North Yakima, *Watt*, August, 1895; *Flett* 1041; Ellensburg, *Piper* 2682; Simcoe Valley, *Lyall* in 1860; without locality, *Vasey* in 1889; "Barren grounds of the Columbia," *Douglas;* Pasco, *Hindshaw* 7; *Piper* 2975; Ritzville, *Sandberg & Leiberg* 160; Clarks Springs, *Kreager* 115; Moses Lake, *Cotton* 615.
ZONAL DISTRIBUTION: Arid Transition and Upper Sonoran.

4. **Mentzelia integrifolia** (S. Wats.) Rydberg, Mem. N. Y. Bot. Gard. **1**: 271. 1901.
Mentzelia albicaulis integrifolia S. Wats. Bot. King Explor. 114. 1871.
Mentzelia dispersa S. Wats. Proc. Am. Acad. **11**: 137. 1876.
TYPE LOCALITY: East Humboldt Mountains, Nevada.
RANGE: Washington and Montana to California and Colorado.
SPECIMENS EXAMINED: Similkameen, *Lyall* in 1860; Wenache, *Whited* 1121; Tumwater Canyon, *Sandberg & Leiberg* 519; Ellensburg, *Elmer*, July, 1897; *Piper* 2739; Spokane, *Piper* 1846; *Leiberg* 20; Marshall Junction, *Piper* 2252; without locality, *Vasey* in 1889; Wawawai, *Lake & Hull* 586; Wenas, *Cotton* 84.
ZONAL DISTRIBUTION: Arid Transition and Upper Sonoran.

5. **Mentzelia tenerrima** Rydberg, Mem. N. Y. Bot. Gard. **1**: 271. 1900.
TYPE LOCALITY: "Foot of Electric Peak," Montana.
RANGE: Washington to Montana.
SPECIMENS EXAMINED: Klickitat River, *Flett* 1017.

CACTACEAE. CACTUS FAMILY.

Plants jointed, the segments flat; leaves subulate and deciduous .... OPUNTIA.
Plants globose or ovoid, tubercled .... CACTUS.

OPUNTIA. PRICKLY PEAR.

Joints tumid, ovate, rarely 5 cm. long .... 2. *O. fragilis*.
Joints compressed, orbicular, or elliptic, 5 to 10 cm. long.
    Seeds 5 or 6 mm. broad .... 1. *O. polyacantha*.
    Seeds 4 mm. broad .... 1a. *O. polyacantha borealis*.

1. **Opuntia polyacantha** Haw. Suppl. Pl. Succ. 82. 1819.
Cactus ferox Nutt. Gen. **1**: 296. 1818, not Willd. 1809.
Opuntia missouriensis DC. Prod. **3**: 472. 1828.
TYPE LOCALITY: "In arid situations on the plains of the Missouri."
RANGE: British Columbia to North Dakota, south to Arizona and New Mexico.

Specimens examined: Kennewick, *Piper;* Morgans Ferry, *Suksdorf* 314; Walla Walla to Fort Colville, *Lyall* in 1860; Almota, *Piper.*

Zonal distribution: Upper Sonoran.

1a. **Opuntia polyacantha borealis** Coulter, Contr. Nat. Herb. **3**: 436. 1896.

Opuntia missouriensis microsperma Engelm. & Bigel. Pac. R. Rep. **4**: 46. 1856, not *O. mesacantha microsperma* Engelm.

Type locality: "On the Missouri about Fort Pierre."

Range: British Columbia to Oregon and South Dakota.

Specimens examined: Whidby Island, *Gardner,* July, 1897; Sucia Island, *Randolph.*

Zonal distribution: Humid Transition.

2. **Opuntia fragilis** (Nutt.) Haw. Suppl. Pl. Succ. 82. 1819.

Cactus fragilis Nutt. Gen. **1**: 296. 1818.

Type locality: "From the Mandans to the mountains, in sterile but moist situations," probably in North Dakota.

Range: South Dakota to British Columbia and Colorado.

Specimens examined: Rock Island, Chelan County, *Sandberg & Leiberg* 444, July 13, 1893.

Zonal distribution: Probably Upper Sonoran.

CACTUS.

1. **Cactus** sp. indet.

Specimens examined: Sentinel Bluffs, *Cotton,* July 14, 1903; Wenache Mountains, *Cotton* 1570; Near Egbert Springs, according to *Leiberg.*

Zonal distribution: Upper Sonoran.

This species is quite certainly new, but can not be satisfactorily described at present.

ELEAGNACEAE. Oleaster Family.

LEPARGYREA.

1. **Lepargyrea canadensis** (L.) Greene, Pittonia **2**: 122. 1890. Buffalo berry.

Hippophae canadensis L. Sp. Pl. **2**: 1024. 1753.

Shepherdia canadensis Nutt. Gen. **2**: 240. 1818.

Type locality: "Habitat in Canada."

Range: Alaska to Newfoundland, southward to Oregon, Utah, and New York.

Specimens examined: Fairhaven, *Henderson,* July 2, 1892; *Piper* 2806, September, 1892; Whidby Island, *Gardner* 264; Easton, *Henderson,* June 11, 1892; Semiamoo Bay, *Lyall* in 1858-59; without locality, *Vasey* in 1889; Fidalgo Island, *Flett* 2117; Conconully, *Whited* 1326; *Griffiths & Cotton* 316; Box Canyon, *Kreager* 400.

Zonal distribution: Transition and Canadian.

In Gorman's paper on the Washington Forest Reserve appears the name *Lepargyrea argentea.* Mr. Gorman informs me, however, that the plant is really *L. canadensis.*

LYTHRACEAE. Loosestrife Family.

Calyx tube cylindric, striate .... Lythrum.
Calyx tube campanulate.
  Capsule bursting irregularly .... Ammannia.
  Capsule septicidally dehiscent .... Rotala.

LYTHRUM.

1. **Lythrum hyssopifolia** L. Sp. Pl. **1**: 447. 1753.

Type locality: "Habitat in Germaniae, Helvetiae, Angliae, Gallia inundatus."

Range: Maine to New Jersey. Washington to California. Introduced from Europe.

SPECIMENS EXAMINED: Lake Washington, *Suksdorf* 971: **Seattle,** ***Smith*** **100:** ***Piper*** 1049, July, 1895.

This was included in Suksdorf's list as *L. album* H. B. K. **The species has long** been established and appears native.

AMMANNIA.

1. **Ammannia coccinea** Rottb. Pl. Hort. Havn. Descr. 7. 1773.

Ammannia latifolia Torr. & Gr. Fl. **1**: 480. 1840.

TYPE LOCALITY: Not ascertained.

RANGE: Washington to Indiana and Florida. Central and South America.

SPECIMENS EXAMINED: West Klickitat County, *Suksdorf* 1720.

ROTALA.

1. **Rotala ramosior** (L.) Koehne; Mart. Fl. Bras. **13**²: 194. 1874.

Ammannia ramosior L. Sp. Pl. **1**: 120. 1753.

Ammannia humilis Michx. Fl. **1**: 99. 1803.

TYPE LOCALITY: Virginia.

RANGE: Washington to Massachusetts, southward to Central and South America.

SPECIMENS EXAMINED: Lake Chelan, *Lake & Hull*, August, 1892; Spokane County, *Suksdorf* 303; Spokane, *Piper* 2611; Almota, *Piper*, September, 1897.

ZONAL DISTRIBUTION: Arid Transition and Upper Sonoran.

ONAGRACEAE. EVENING PRIMROSE FAMILY.

- Parts of the flower in twos; fruit indehiscent.............. CIRCAEA (p. 399).
- Parts of flower in fours.
  - Fruit few-seeded, nut-like; leaves alternate................ GAURA (p. 399).
  - Fruit many-seeded.
    - Calyx limb divided to the ovary, persistent, petals minute or wanting.............................. ISNARDIA (p. 399).
    - Calyx limb deciduous; petals conspicuous.
      - Seeds comose, lower leaves mostly opposite...... EPILOBIUM (p. 399).
      - Seeds naked, not comose; leaves all alternate.
        - Anthers versatile.
          - Stamens of equal length.
            - Stigmas deeply 4-cleft, the lobes linear.
              - Ovules in 1 row; flowers yellow. OENOTHERA (p. 407).
              - Ovules in 2 rows; flowers pink. ANOGRA (p. 407).
            - Stigmas entire or nearly so.
              - Calyx-tube longer than the ovary, flowers large......... TARAXIA (p. 405).
              - Calyx-tube shorter than the ovary, flowers small........ SPHAEROSTIGMA (p. 405).
          - Stamens of unequal length, the outer ones longest.
            - Annuals, small-flowered; caulescent. GAYOPHYTUM (p. 407).
            - Biennials; large-flowered, acaulescent.
              - Capsule 4-angled; seeds grooved on one side................. PACHYLOPHUS (p. 408).
              - Capsule 4-winged; seeds not grooved.................... LAVAUXIA (p. 409).

Anthers not versatile.
Petals sessile.
Calyx lobes reflexed; petals entire.... Godetia (p. 409).
Calyx lobes erect; petals 2-lobed...... Boisduvalia (p. 410).
Petals clawed; calyx lobes reflexed........ Clarkia (p. 411).

CIRCAEA.

Leaves denticulate; racemes bractless.................................. 2. *C. pacifica.*
Leaves dentate; racemes with minute bracts............................ 1. *C. alpina.*

1. **Circaea alpina** L. Sp. Pl. 1: 9. 1753.

Type locality: "Habitat ad radices montium in frigidis Europae."

Range: Alaska to Labrador, southward to Washington, Dakota, and Georgia.

Specimens examined: Olympic Mountains, *J. M. Grant* 11; Skokomish Valley, *Kincaid*, May 29, 1892; Blue Mountains, *Lake & Hull* 533; Snoqualmie Falls, *Piper*, September, 1902; Quinault, *Conard* 133.

Zonal distribution: Canadian.

2. **Circaea pacifica** Aschers. & Magnus, Bot. Zeit. **29**: 392. 1871.

Type locality: San Francisco, California.

Range: British Columbia and Idaho to California.

Specimens examined: Seattle, *Piper* 109; Silverton, *Bouck;* upper Nisqually Valley, *Allen* 301; near Skagit Pass, *Lake & Hull* 533; Peshastin, *Sandberg & Leiberg;* Blue Mountains, *Piper* 2409.

Zonal distribution: Transition.

GAURA.

1. **Gaura parviflora** Dougl.; Hook. Fl. Bor. Am. 1: 208. 1830; Lehm. Pug. **2**: 15. 1830.

Type locality: "Sandy banks of the Wallawallah River." Collected by Douglas, according to Hooker.

Range: Washington to Dakota, Louisiana, and Mexico.

Specimens examined: Wawawai, *Elmer* 898; *Piper*, July, 1898, and 1629; without locality, *Brandegee* 789; Prosser, *Cotton* 741.

Zonal distribution: Upper Sonoran.

ISNARDIA.

1. **Isnardia palustris** L. Sp. Pl. **1**: 120. 1753.

Ludwigia nitida Michx. Fl. **1**: 87. 1803.

Ludwigia palustris Ell. Bot. S. C. & Ga. **1**: 211. 1821.

Type locality: "Habitat in Galliae, Alsatiae, Russiae, Virginiae fluviis."

Range: Washington to Nova Scotia, southward to California, Mexico, and Florida. Europe. Asia.

Specimens examined: Yakima Region, *Brandegee* 777; Clarke County, *Henderson*, September 6, 1892; Waitsburg, *Horner* 585; Seattle, *Piper* in 1885.

Zonal distribution: Humid Transition.

EPILOBIUM. Willow herb.

Calyx tube not prolonged beyond the ovary; flowers large. Stems 1 to 2 m. tall; bracts small; style pubescent at base........... 1. *E. angustifolium.*
Stems 15 to 50 cm. high; bracts leaf-like; style glabrous...... 2. *E. latifolium.*
Calyx teeth prolonged beyond the ovary; flowers mostly small.
Flowers pale yellow; stigmas 4-cleft.......................... 3. *E. luteum.*
Flowers white or pink.
Annuals; leaves narrow; stigmas mostly 4-cleft.
Stems simple or but little branched, 8 to 20 cm. high; herbage crisp-puberulent................. 5. *E. minutum.*

Stems usually much branched, 30 to 90 cm. high; herbage glabrous or glandular.
Flowers small, 10 to 15 mm. broad............ 4. *E. paniculatum.*
Flowers large, 20 to 40 mm. broad............ 4a. *E. paniculatum jucundum.*

Perennials; stigmas subentire.
Stems tall, 30 to 90 cm. high.
Leaves linear-oblong, sessile, nearly entire, the margins revolute........................ 6. *E. palustre.*
Leaves lanceolate to ovate, dentate or denticulate, not revolute.
Petals 6 to 10 mm. long; herbage canescent-puberulent............................ 7. *E. franciscanum.*
Petals 3 to 5 mm. long; herbage not canescent-puberulent.
Capsule pedicelled.
Pedicels shorter than the capsules; leaves ovate-lanceolate, petiolate 8. *E. adenocaulon.*
Pedicels equaling the capsules; leaves oblong-lanceolate, sessile, decurrent.................... 9. *E. halleanum.*
Capsule sessile; leaves ovate or elliptic, sessile............................ 10. *E. brevistylum.*
Stems low; species mostly alpine or subalpine.
Seeds smooth.
Leaves entire; plants creeping or stoloniferous.
Stems ascending, usually curved; leaves spreading, oval or oblong, thick.... 11. *E. anagallidifolium.*
Stems erect; leaves ascending, linear or oblong-lanceolate.............. 12. *E. oregonense.*
Leaves or some of them toothed, thin.
Flowers white, 5 to 6 mm. broad...... 13. *E. alpinum.*
Flowers purple, 10 to 15 mm. broad.. 14. *E. hornemanni.*
Seeds papillate.
Foliage glaucous and glabrous............ 15. *E. fastigiatum.*
Foliage not glaucous.
Plants producing stolons.
Leaves narrow, erect, keeled below......................... 16. *E. pringleanum.*
Leaves broader, spreading, not keeled.
Matted; leaves firm, pale green, sessile............. 17. *E. clavatum.*
Not matted; leaves thin, bright green, petiolate..... 14. *E. hornemanni.*
Plants not producing stolons.
Stems branched.
Seeds 1 mm. long; stem pubescent in lines; pedicels about as long as the capsules.... 18. *E. leptocarpum.*
Seeds 2 mm. long; stems pubescent but not in lines; pedicels much shorter than the capsules............. 19. *E. mirabile.*

Stems simple.
  Herbage pilose-pubescent... 20. *E. ursinum.*
  Herbage not pilose-pubescent.
    Leaves sessile, narrow, erect, acute.......... 21. *E. drummondii.*
    Leaves petioled, broadish, spreading, obtuse..... 22. *E. delicatum.*

1. **Epilobium angustifolium** L. Sp. Pl. **1**: 347. 1753. FIREWEED.

Epilobium spicatum Lam. Fl. Fr. **3**: 482. 1778.

TYPE LOCALITY: European.

RANGE: Alaska to Labrador, southward to California, New Mexico, and Carolina.

SPECIMENS EXAMINED: Silverton, *Bouck* 77; Fish Lake, *Dunn*, August 1, 1900; near Egbert Springs, *Sandberg & Leiberg* 407; North Fork Bridge Creek, *Elmer* 637; Coulee City, *Lake & Hull* 528; Fort Colville, *Lyall* in 1860; Cascade Mountains, latitude 49°, *Lyall* in 1859; without locality, *Vasey* 242; Rock Lake, *Lake & Hull*, August, 1892; Clarks Springs, *Kreager* 126; Clallam County, *Elmer* 2566; North Yakima, *Watt*, August, 1895.

ZONAL DISTRIBUTION: Upper Sonoran and Transition.

EPILOBIUM OPACUM,[a] said by Hooker to have been collected by Douglas and by Scouler about Fort Vancouver, is probably a form of *E. angustifolium*.

2. **Epilobium latifolium** L. Sp. Pl. **1**: 347. 1753.

TYPE LOCALITY: Siberia.

RANGE: Arctic America, southward to Oregon, Colorado, and Canada.

SPECIMENS EXAMINED: Olympic Mountains, *Piper* 2343; Mount Rainier, *Smith* 875; Silverton, *Bouck*; Horseshoe Basin, *Lake & Hull* 530; North Fork Bridge Creek; *Elmer* 664.

ZONAL DISTRIBUTION: Arctic.

3. **Epilobium luteum** Pursh, Fl. **1**: 259. 1814.

TYPE LOCALITY: Northwest coast of America. Collected by Menzies.

RANGE: Alaska to Oregon.

SPECIMENS EXAMINED: Mount Rainier, *Flett* 300; *Piper*, August, 1895; *Allen* 293; Mount Adams, *Suksdorf* 549; Stampede Tunnel, *Henderson* 2440; Horseshoe Basin, *Lake & Hull* 529; Mount Stuart, *Elmer* 1091; Stevens Pass, *Sandberg & Leiberg* 730; Cascade Mountains, latitude 49°, *Lyall;* Clallam County, *Elmer* 2560.

ZONAL DISTRIBUTION: Canadian and Hudsonian.

4. **Epilobium paniculatum** Nutt.; Torr. & Gr. Fl. **1**: 490. 1840.

TYPE LOCALITY: "Plains of the Oregon and Rocky Mountains." Collected by Nuttall.

RANGE: British Columbia to California, Arizona, and Colorado.

SPECIMENS EXAMINED: Seattle, *Piper* 103; Silverton, *Bouck* in 1889; Tacoma, *Flett* 130; Nisqually Valley, *Allen* 14; Lake Park, *Piper* in 1895; Mount Stuart, *Elmer* 1092; Wenache, *Whited* 1330, 1159; North Yakima, *Watt* in 1895; Tieton River, *Cotton* 488; Peshastin, *Sandberg & Leiberg* 538; Lake Chelan, *Lake & Hull* 525; Spokane, *Piper* 2361, 2360; Blue Mountains, *Piper*, August 2, 1896, 2358; Pullman, *Piper* 1631; *Hull* in 1892; without locality, *Vasey* in 1889; Spokane, *Kreager* 573, 536; Clallam County, *Elmer* 2558, 2561; Mount Carlton, *Kreager* 152.

ZONAL DISTRIBUTION: Transition.

4a. **Epilobium paniculatum jucundum** (A. Gray) Trelease, Rep. Mo. Bot. Gard. **2**: 85. 1891.

Epilobium jucundum A. Gray, Proc. Am. Acad. **12**: 57. 1876.

TYPE LOCALITY: Scott Valley, California. Collected by Greene.

RANGE: Washington to California.

SPECIMENS EXAMINED: Klickitat County, *Suksdorf* 17; Leavenworth, *Whited* 247.

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[a] Lehm. Pug. **2**: 14. 1830.

Epilobium paniculatum is a very variable species, or perhaps a complex of several. Suksdorf, besides recognizing *E. jucundum* as a valid species, proposes two others, *E. apricum* and *E. fasciculatum*.[a]

5. **Epilobium minutum** Lindl.; Hook. Fl. Bor. Am. 1: 207. 1833.

Type locality: "North-West coast of America. Fort Vancouver. Near the Grand Rapids of the Columbia." Collected at these points respectively by Menzies, Scouler, and Douglas.

Range: British Columbia to California in the coast region mainly.

Specimens examined: Seattle, *Piper* 459; Whidby Island, *Gardner* 123; Cascade Mountains, latitude 49°, *Lyall*; Silverton, *Bouck*; Mount Stuart, *Elmer* 1203; Nisqually Valley, *Allen* 253; west Klickitat County, *Suksdorf* 81, 2108, 18; Rock Lake, *Sandberg & Leiberg* 109; Blue Mountains, *Horner* 290.

Zonal distribution: Transition.

A rather variable species, but it will require further material and study to determine how many of the forms are worthy of recognition. Torrey and Gray recognized *E. minutum foliosum*,[b] based on Nuttall's MSS. name *E. foliosum*. Haussknecht [c] recognized three subspecies, namely, *stenophyllum* (=*foliosum* Nutt.), *platyphyllum*, and *adenophorum*.

Suksdorf[d] considers *foliosum* a good species and also describes *A. minutum canescens* and *A. foliosum glabrum*.

6. **Epilobium palustre** L. Sp. Pl. 1: 348. 1753.

Type locality. European.

Range: Alaska to Washington, Colorado, and Canada. Europe. Asia.

Specimens examined: Falcon Valley, *Suksdorf* 374.

7. **Epilobium franciscanum** Barbey in Brewer & Wats. Bot. Cal. 1: 220. 1876.

Type locality: "Near San Francisco," California.

Range: Washington to California.

Specimens examined: Lake Kalispel, *Kreager*, July 30, 1902; Spokane, *Piper* 2269.

Zonal distribution: Arid Transition.

The specimen listed by Suksdorf as *E. watsoni* Barbey is the same as the Spokane plant above mentioned.

8. **Epilobium adenocaulon** Haussk. Oestr. Bot. Zeitschr. 29: 119. 1879.

Type locality: Ohio.

Range: British Columbia to New Brunswick, south to California, Colorado, and Pennsylvania.

Specimens examined: Clallam County, *Elmer* 2568; Montesano, *Heller* 3992, 3974; Mount Constitution, *Henderson* 2460; Seattle, *Piper* 102; Sumas Prairie, *Lyall* in 1858–59; Nisqually Valley, *Allen* 15; North Yakima, *Watt*, August, 1895; *Henderson* 2461; Rattlesnake Mountains, *Cotton* 420; Falcon Valley, *Suksdorf* 2150; Lake Keechelus, *Henderson* 2462; Coulee City, *Lake & Hull* 174, 744; Alkali Lake, *Sandberg & Leiberg* 412; Spokane, *Piper* 3515.

Zonal distribution: Upper Sonoran and Transition.

A very variable species. The specimens referred in Cooper's Report to *Epilobium tetragonum* L. doubtless belong here.

8a. **Epilobium adenocaulon occidentale** Trelease, Rep. Mo. Bot. Gard. 2: 95. 1891.

Type locality: Beaver City, Utah.

Range: Washington to California and Arizona.

Specimens examined: Wenache, *Whited* in 1895, 1300; Beaver Creek, *Whited* 3; Spokane, *Piper*, June 25, 1897; Pullman, *Piper* 3056, 3057, 1632; *Hull* 792.

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[a] West Am. Scientist 11: 77. 1901.

[b] Fl. 1: 490. 1840.

[c] Monog. Epil. 248. 1884.

[d] Deutsch. Bot. Monatss. 18: 87. 1900.

9. **Epilobium halleanum** Haussk. Monog. Epil. 261. 1884.

Type locality: "Hab. in Oregon." Collected by Hall.

Range: Vancouver Island to Oregon in the coast region.

Specimens examined: Seattle, *Piper* 1130; Falcon Valley, *Suksdorf* 2308; Klickitat County, *Suksdorf* 15; Skamania County, *Suksdorf* 2309; Vancouver, *Piper* 4929.

Zonal distribution: Humid Transition.

10. **Epilobium brevistylum** Barbey in Brewer & Wats. Bot. Cal. **1**: 220. 1876.

Type locality: Sierra County, California.

Range: Washington to California.

Specimens examined: Olympic Mountains, *Piper* 2345; Chiquash Mountains, *Suksdorf* 2189; Mount Adams, *Suksdorf* 550; Mount Stuart, *Elmer* 1202; Railroad Creek, *Elmer* 701; Olympic Mountains, *Elmer* 2569.

Zonal distribution: Hudsonian.

11. **Epilobium anagallidifolium** Lam. Encyc. **2**: 376. 1786.

Type locality: "Mont-d'Or."

Range: Arctic America, south to Labrador and in the mountains to California and Colorado. Europe. Asia.

Specimens examined: Olympic Mountains, *Piper* 2354; Tatoosh Mountains, *Allen* 189; North Fork Bridge Creek, *Elmer* 640; Mount Adams, *Flett* 1241.

Zonal distribution: Artic.

12. **Epilobium oregonense** Haussk. Monog. Epil. 276. 1884.

Type locality: Oregon. Collected by Hall.

Range: British Columbia to Oregon.

Specimens examined: Olympic Mountains, *Piper* 2351; Lake Keechelus, *Henderson* in 1892.

Zonal distribution: Canadian and Hudsonian.

13. **Epilobium alpinum** L. Sp. Pl. **1**: 348. 1753.

Epilobium lactiflorum Haussk. Oesterr. Bot. Zeitschr. **29**: 89. 1879.

Type locality: "Habitat in Alpibus Helveticis, Lapponicis."

Range: Subarctic regions, southward to Oregon, Utah, and New Hampshire. Europe.

Specimens examined: Mount Rainier, *Allen* 190; *Piper* 2166; Mount Constitution, *Henderson* 2453; Mount Adams, *Suksdorf* 16; Silverton, *Bouck* in 1899; Skokomish River, *Kincaid* 2250½; Stevens Pass, *Sandberg & Leiberg* in 1893; Stampede Tunnel, *Henderson* 2454; Chiquash Mountains, *Suksdorf* 2032; Cascade Mountains to Colville, latitude 49°, *Lyall* in 1860; Nason Creek, *Sandberg & Leiberg* 677.

Zonal distribution: Hudsonian and Arctic.

14. **Epilobium hornemanni** Reichenb. Ic. Crit. **2**:73. 1825.

Epilobium nutans Hornem. in Oeder, Fl. Dan. 1387. 1810, not Schmidt, 1795.

Type locality: "In turfosis alpinis Norvegiae."

Range: British Columbia to Canada, south to California, Colorado, and the White Mountains. Europe. Asia.

Specimens examined: Olympic Mountains, *Piper* 2355, 1047, 2353, 2346, 2348, 2347; Mount Adams, *Suksdorf* 553; Mount Stuart, *Brandegee* 778; Atanum River, *Henderson* 2445; Wenache Mountains, *Elmer* 469; Mount Rainier, *Allen* 191; Bridge Creek, *Elmer* 744; Mount Rainier, *Piper* 2168, 1048; Blue Mountains, *Piper* 2359; *Horner* 289.

Zonal distribution: Hudsonian.

Both the characters relied upon to separate this species from *E. alpinum*, namely, the rough seed and larger, darker flowers, break down completely in our material, and there is no evidence that the connecting forms are hybrids.

15. Epilobium fastigiatum (Nutt.)

Epilobium affine fastigiatum Nutt.; Torr. & Gr. Fl. 1: 489. 1840.

Epilobium glaberrimum latifolium Barbey in Brewer & Wats. Bot. Cal. 1: 220. 1876.

Epilobium glaberrimum fastigiatum Trelease, Rep. Mo. Bot. Gard. 2: 105. 1891.

Type locality: "Plains of the Oregon." Collected by Nuttall.

Range: Washington to California and Utah.

Specimens examined: Olympic Mountains, *Flett* 115; Mount Rainier, *Allen* 193; *Smith* 755; *Piper* 2167, August 1895; Mount Adams, *Henderson* 2444; Mount Stuart, *Brandegee* 777; Cascade Mountains, latitude 49°, *Lyall* in 1859; Blue Mountains, *Horner* 238; Clallam County, *Elmer* 2559.

15a. Epilobium fastigiatum glaberrimum (Barbey).

Epilobium glaberrimum Barbey in Brewer & Wats. Bot. Cal. 1: 220. 1876.

Type locality: Yosemite Valley, California.

Range: Washington to California and Nevada.

Specimens examined: White Salmon, *Suksdorf* in 1878.

16. Epilobium pringleanum Haussk. Mittheil. Geogr. Gesells. Jena 7: 5. 1888.

Epilobium oregonense gracillimum Trelease, Rep. Mo. Bot. Gard. 2: 109. 1891.

Type locality: "California, mountains about the headwaters of the Sacramento River."

Range: Washington to California.

Specimens examined: Falcon Valley, *Suksdorf*, July, 1886; White Salmon, *Suksdorf* in 1878; Mount Adams, *Suksdorf* 552; without locality, *Vasey* in 1889.

17. Epilobium clavatum Trelease, Rep. Mo. Bot. Gard. 2: 111. 1891.

Type locality: Kicking Horse River, British Columbia.

Range: British Columbia to Oregon and Utah.

Specimens examined: Olympic Mountains, *Piper* 2350, 2349; Mount Rainier, *Piper* 2165, 2164; *Allen* 192; Goat Mountains, *Allen* 252; Mount Adams, *Suksdorf*, September, 1877, August 28, 1886; North Fork Bridge Creek, *Elmer* 654; Clallam County, *Elmer* 2570.

Zonal distribution: Arctic.

18. Epilobium leptocarpum macounii Trelease, Rep. Mo. Bot. Gard. 2: 103. 1891.

Type locality: "Lake Athabasca." Collected by Macoun.

Range: British America to Washington.

Specimens examined: Olympic Mountains, *Piper* 2352, 2356; Mount Adams, *Suksdorf* 551.

Zonal distribution: Hudsonian.

19. Epilobium mirabile Trelease, sp. nov.

Turioniferous; stems rather slender, terete, crisp-pubescent, ascending from near the base, about a foot high, with rather short strict branches; leaves scarcely 25 mm. long, somewhat ascending, broadly ovate-lanceolate, obtuse, remotely very low denticulate, rounded at base and very short-petioled, rather thick, minutely crisp-puberulent or at length subglabrescent; inflorescence somewhat glandular; flowers suberect, crowded at summit; petals about 5 mm. long, pale; capsules short-stalked, about 40 mm. long, curved, fusiform; seeds as in *E. paniculatum*, the at first very white ample coma soon falling and at length dingy.—Meadows at 1,500 meters altitude, in the Olympic Mountains, Washington (*Piper*, August, 1895, no. 2344).—A very peculiar plant, with the seed and foliage characters of E. *minutum*, but exaggerated, and the turions of the *delicatum* section, in which in stem and pubescence characters it falls near *E. leptocarpum*.

20. Epilobium ursinum Parish; Trelease, Rep. Mo. Bot. Gard. 2: 100. 1891.

Type locality: San Bernardino County, California.

Range: Washington to California.

Specimens examined: Falcon Valley, *Suksdorf* 2148, 372; Klickitat River, *Flett* 1238.

21. Epilobium drummondii Haussk. Monog. Epil. 271. 1884.

Type locality: "Hab. in Rocky Mts." Collected by Drummond.

Range: British Columbia to Nevada and Colorado.

Specimens examined: Falcon Valley, *Suksdorf* 2149.

22. Epilobium delicatum tenue Trelease, Rep. Mo. Bot. Gard. **2**: 99. 1891.

Type locality: Union County, Oregon. Collected by Cusick.

Range: Washington to Colorado.

Specimens examined: Olympic Mountains, *Piper*, August, 1895; Skamania County, *Suksdorf* 2309.

Epilobium davuricum Fisch. in Hornem. Hort. Bot. Havn. Suppl. 44. 1819. Hausskneeht in his Monograph reports this from Tacoma, collected by Krause, but we have seen no specimens thus referable. It was originally described from Siberia, and ranges at least as far east as Alaska.

Epilobium origanifolium Lam. This name appears on Suksdorf's list, but the species is not known to occur in North America.

TARAXIA.

- White-pubescent; leaves deeply pinnatifid................ 1. *T. tanacetifolia.*
- Glabrous or nearly so.
  - Leaves entire or denticulate........................ 2. *T. heterantha.*
  - Leaves pinnatifid .... 2a. *T. heterantha taraxacifolia.*

1. Taraxia tanacetifolia (Torr. & Gr.).

Oenothera tanacetifolia Torr. & Gr. Pacif. R. Rep. **2**: 121. *pl. 4.* 1854.

Taraxia longiflora Nutt.; Small, Bull. Torr. Club **23**: 185. 1896.

Oenothera nuttallii Torr. & Gr. Fl. **1**: 506. 1840, not Sweet, 1830.

Type locality: "On the higher parts of the Sierra Nevada; latitude 41°, California.

Range: Washington to Nevada and California.

Specimens examined: Ritzville, *Sandberg & Leiberg* 162; Crab Creek country, *Suksdorf* 308; Spokane County, *Suksdorf* 309; Marshall Junction, *Piper* 2259.

Zonal distdibution: Arid Transition.

2. Taraxia heterantha (Nutt.) Small, Bull. Torr. Club **23**: 185. 1896.

Oenothera heteratha Nutt. Journ. Acad. Phila. **7**: 22. 1834.

Type locality: "Towards the sources of the Columbia, in dry prairies." Collected by Wyeth.

Range: Washington and Idaho to Nevada and Utah.

Specimens examined: Klickitat River, *Flett* 1012; Rock Creek, *Sandberg & Leiberg* 130; Spangle, *Piper* 2835; without locality, *Vasey* in 1889; Wenache Mountains, *Cotton* 1195.

Zonal distribution: Arid Transition.

2a. Taraxia heterantha taraxacifolia (S. Wats.) Small, Bull. Torr. Club. **23**: 185. 1896.

Oenothera heterantha taraxacifolia S. Wats. Proc. Am. Acad. **8**: 589. 1873.

Taraxia taraxacifolia Heller, Muhlenbergia **1**: 1. 1900.

Type locality: Near Austin, Nevada.

Range: Washington to California.

Specimens examined: Rock Creek, Spokane County, *Sandberg & Leiberg*, 120 in part; Grand Coulee, *Griffiths & Cotton* 451; Walla Walla, *Griffiths & Cotton* 451.

Zonal distribution: Arid Transition.

SPHAEROSTIGMA.

- Flowers axillary, yellow or yellowish.
  - Capsule linear, more or less curved.................................... 1. *S. contortum.*
  - Capsule broadest at base, attenuate upward.
    - Seeds pale, linear; flowers very small.......................... 2. *S. andinum.*
    - Seeds dark, clavate; flowers larger............................. 3. *S. hilgardi.*

Flowers white or rose-colored, in nodding spikes.
  Herbage viscid-glandular .... 4. *S. boothii.*
  Herbage puberulent, not glandular .... 5. *S. alyssoides.*

1. Sphaerostigma contortum (Dougl.) Walp. Repert. **2**: 78. 1843.

Oenothera contorta Dougl.; Hook. Fl. Bor. Am. **1**: 214. 1833.

Type locality: "Sandy barren soil on the interior banks of the Columbia River." Collected by Douglas.

Specimens examined: 1. Form with stalked pods: Wilson Creek, *Sandberg & Leiberg* 263; without locality, *Vasey* in 1889; Pasco, *Piper* 2965a; North Yakima, *Henderson*, May 27, 1892.

2. Form with pods sessile: Pasco, *Piper* 2965b; west Klickitat County, *Suksdorf* 555, 85; Bingen, *Suksdorf* 2311; Ilia, *Lake & Hull.*

Zonal distribution: Upper Sonoran.

The two forms above listed are probably distinct, but it remains to be determined which is typical *S. contortum*, as the distinguishing character does not appear in the original description. The sessile-podded form was later described as *S. strigulosa* Fisch. & Mey. from California. The whole group is in need of critical study.

2. Sphaerostigma andinum (Nutt.) Walp. Repert. **2**: 79. 1843.

Oenothera andina Nutt.; Torr. & Gr. Fl. **1**: 512. 1840.

Type locality: "Dry plains in the Rocky Mountains, near Black-Foot River." Collected by Nuttall.

Range: Washington and Montana to Nevada and Utah.

Specimens examined: Wenache, *Whited* 86; Ellensburg, *Piper* 2675; *Elmer* 429; North Yakima, *Henderson*, May, 1892; Klickitat County, *Suksdorf* 311; *Flett* 1230; Klickitat Valley, *Howell* 1503; Pasco, *Piper* 2994; Spangle, *Piper*, June, 1899; Walla Walla region, *Brandegee* 786; without locality, *Vasey* 235; Coulee City, *Piper* 3907, 3908; Ellensburg, *Cotton* 865.

Zonal distribution: Upper Sonoran.

3. Sphaerostigma hilgardi (Greene) Small, Bull. Torr. Club **23**: 188. 1896.

Oenothera hilgardi Greene, Bull. Torr. Club **10**: 41. 1883.

Type locality: "On moist alkaline soil of the Klickitat Swale," Washington. Collected by Hilgard.

Range: Eastern Washington.

Specimens examined: Wenache, *Whited* 1093; Ellensburg, *Piper*, May 20, 1897; North Yakima, *Elmer* 1082; Crab and Wilson creeks, *Sandberg & Leiberg* 290; Sprague, *Sandberg & Leiberg* 145; between Coulee City and Waterville, *Spillman*, May 27, 1896; Ellensburg, *Cotton* 865.

Zonal Distribution: Upper Sonoran.

4. Sphaerostigma boothii (Dougl.) Walp. Rep. **2**: 77. 1843.

Oenothera boothii Dougl.; Hook. Fl. Bor. Am. **1**: 213. 1833.

?*Oenothera pygmaea* Dougl.; Hook. Fl. Bor. Am. **1**: 213. 1833.

Type locality: "On low exposed gravelly hills, near the branches of Lewis and Clark's River, lat. 46° north." Collected by Douglas.

Range: Washington to California and Nevada.

Specimens examined: Rock Island, *Sandberg & Leiberg* 441; Snake River, Walla Walla region, *Brandegee* 785; *Tweedy*, June, 1883.

Zonal distribution: Upper Sonoran.

5. Sphaerostigma alyssoides minutiflorum (S. Wats.) Small, Bull. Torr. Club **23**: 192. 1896.

Oenothera alyssoides minutiflora S. Wats. Proc. Am. Acad. **8**: 591. 1873.

Type locality: "Northern Nevada and about Salt Lake, Utah."

RANGE: Washington to Nevada and Utah.

SPECIMENS EXAMINED: Near Morgans Ferry, *Suksdorf* 310; Crab and Wilson creeks, *Sandberg & Leiberg* 262.

ZONAL DISTRIBUTION: Upper Sonoran.

OENOTHERA. EVENING PRIMROSE.

1. **Oenothera biennis muricata** (L.) Lindl. Bot. Reg. **19**: under *pl. 1604*. 1833.

Oenothera muricata L. Syst. Veg. ed. 12. 263. 1767.

TYPE LOCALITY: "Canada."

RANGE: British Columbia and Washington; New England to Nova Scotia and Quebec.

SPECIMENS EXAMINED: Whidby Island, *Gardner* 407; Tacoma, *Flett* 149; Waitsburg, *Horner* 181; Meyers Falls, *Beattie & Chapman* 199.

ZONAL DISTRIBUTION: Transition.

1a. **Oenothera biennis strigosa** (Rydberg).

Onagra strigosa Rydberg, Mem. N. Y. Bot. Gard. 1: 278. 1900.

Oenothera biennis canescens Torr. & Gr. Fl. 1: 492. 1840, not *Oenothera canescens* Torr. & Frem. in Frem. Rep. 315. 1845.

TYPE LOCALITY: Pony, Montana.

RANGE: Washington to Montana and Colorado.

SPECIMENS EXAMINED: Wenache, *Whited* 1250; North Yakima, *Watt*, August, 1895; Egbert Springs, *Sandberg & Leiberg* 397; Chelan, *Elmer* 495; Wilson Creek, *Lake & Hull*, August, 1892; Medical Lake, *Henderson*, July, 1892; Almota, *Piper*, September, 1897; Wawawai, *Horner* 673.

ZONAL DISTRIBUTION: Arid Transition and Upper Sonoran.

ANOGRA.

1. **Anogra pallida** (Lindl.) Britton, Bull. Torr. Club **23**: 175. 1896.

Oenothera pallida Lindl. Bot. Reg. **14**: *pl. 1142*. 1828.

TYPE LOCALITY: "In the Northwest of North America." "Growing among sand in all the dry country west of the Rocky Mountains." Collected by Douglas.

RANGE: British Columbia to Mexico.

SPECIMENS EXAMINED: Wenache, *Whited* 1110; Klickitat County, *Suksdorf* 970; White Bluff Ferry, *Lake & Hull*, August, 1892; Pasco, *Piper* 2992; *Hindshaw* 43; Glendale, *Lake & Hull* 522; Crab and Wilson creeks, *Sandberg & Leiberg* 217; Lake Chelan, *Howard* in 1899; Columbia River, latitude 46° to 49°, *Lyall* in 1860; without locality, *Vasey* 537; Kiona, *Piper*, July, 1897; Steamboat Rock, *McKay* 20.

ZONAL DISTRIBUTION: Upper Sonoran.

GAYOPHYTUM.

Seeds canescent with appressed hairs	1. *G. lasiospermum.*
Seeds glabrous.	
Stems branched at base, very leafy, the shoots erect; capsules olong, nearly sessile,	4. *G. pumilum.*
Stems usually much-branched above, remotely leafy; capsules on elongated pedicels.	
Flowers large, 6 to 12 mm. broad	2. *G. diffusum.*
Flowers small, 2 to 4 mm. broad	3. *G. ramosissimum.*

1. **Gayophytum lasiospermum** Greene, Pittonia **2**: 164. 1891.

TYPE LOCALITY: Near Julian, California.

RANGE: Washington to California and Nevada.

SPECIMENS EXAMINED: Wenache, *Whited* 168; Ellensburg, *Piper* 2634; Mount Adams, *Henderson* 2466; Chelan, *Elmer* 488; Crab and Wilson creeks, *Sandberg & Leiberg* 252;

Conconully, *Whited* 1313; Spokane, *Piper* 2634; *Henderson* 2467; Nile, *Henderson* 2464; Sprague, *Lake & Hull*, August, 1892.

ZONAL DISTRIBUTION: Arid Transition.

2. Gayophytum diffusum Torr. & Gr. Fl. **1**: 513. 1840.

TYPE LOCALITY: "Rocky Mountains and plains of Oregon." Collected by Nuttall.

RANGE: Washington and Idaho to California and Colorado.

SPECIMENS EXAMINED: Wenache, *Whited;* along Methow River, *Whited* 220; Loomiston, *Elmer* 609; Lake Chelan, *Lake & Hull*, August, 1892; Klickitat River, *Flett* 1405; Columbia River, latitude 46° to 49°, *Lyall* in 1860; without locality, *Geyer* 546.

ZONAL DISTRIBUTION: Arid Transition.

3. Gayophytum ramosissimum Torr. & Gr. Fl. **1**: 513. 1840.

TYPE LOCALITY: Rocky Mountains. Collected by Nuttall.

RANGE: Washington and Montana to California and Arizona.

SPECIMENS EXAMINED: Mount Adams, *Suksdorf* 2310, 2297, 2296, 2295, 22; *Henderson*, August, 1892; Mount Rainier, *Piper*, August, 1895; Falcon Valley, *Suksdorf* 2257, 20, 21; North Yakima, *Piper*, June, 1897; *Henderson*, May, 1892; Wenache, *Whited* in 1896; Washtucna, *Elmer* 1042; Peshastin, *Sandberg & Leiberg* 528; Cascade Mountains, *Piper*, July, 1895; Nason City, *Sandberg & Leiberg*, July, 1893; without locality, *Brandegee* 781; Ritzville, *Sandberg & Leiberg* 159; without locality, *Vasey* in 1889; Blue Mountains, *Horner* 293, 292; Walla Walla, *Nuttall.*

ZONAL DISTRIBUTION: Arid Transition.

Hooker[a] recognizes two subspecies, but evidently his names have become interchanged in respect to the characters.

Capsules short, the fruiting pedicels refracted .... *G. ramosissimum strictipes.*
Capsules longer, canescent, pedicels erect in fruit............. *G. ramosissimum deflexum.*

4. Gayophytum pumilum S. Wats. Proc. Am. Acad. **18**: 193. 1883.

TYPE LOCALITY: "From San Bernardino County, California, to Washington Territory."

RANGE: Washington to California.

SPECIMENS EXAMINED: Mount Adams, *Suksdorf* 376; Falcon Valley, *Suksdorf*, June, 1881, and 19; Klickitat River, *Suksdorf* 82; bars of Touchet River, *Horner* 286; near Salmon River, *Horner* 284; Blue Mountains, *Horner* 317, 119; Skamania County, *Flett* 1236.

ZONAL DISTRIBUTION: Canadian?

GAYOPHYTUM RACEMOSUM Torr. & Gr., and GAYOPHYTUM CAESIUM Torr. & Gr. Both these names, which are considered to represent one species, appear in Suksdorf's list. The type of the latter was collected in "Oregon, on dry open plains near Walla Walla," by Nuttall, possibly a Washington locality, but many of Nuttall's plants so labelled were collected far to the southeast of Wallula (Old Fort Walla Walla). At any rate we have seen no Washington specimens of the plant, those labelled *G. racemosum* being as a rule *G. ramosissimum.*

PACHYLOPHUS.

Leaves green, glabrous, except the villous margins..................... 1. *P. marginatus.*
Leaves canescent-puberulent on both sides............................ 2. *P. canescens.*

1. Pachylophus marginatus (Nutt.)

Oenothera marginata Nutt.; Torr. & Gr. Fl. **1**: 500. 1840.

TYPE LOCALITY: "Rocky Mountains in Upper California, about lat. 42°," probably in Idaho. Collected by Nuttall.

SPECIMENS EXAMINED: Steptoe Canyon, *McKay.*

ZONAL DISTRIBUTION: Upper Sonoran.

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[a] Lond. Journ. Bot. **6**: 224. 1847.

2. Pachylophus canescens sp. nov.

Acaulescent or nearly so, cespitose, the whole plant canescent with a fine appressed pubescence; root stout and woody, becoming 30 cm. long or more; leaves rather numerous, pale green, oblanceolate, repandly dentate or subentire, obtuse or acute, each attenuate into a petiole with margins narrower than the broad white midrib; calyx canescent, the tube very narrow, 5 to 6 cm. long, twice the length of the lanceolate attenuate lobes; petals broadly obovate, pink, 2 to 3 cm. long; pods 2 to 3 cm. long, linear-oblong, attenuate into a stout beak, canescent like the leaves.

This species is distinguishable from the others of the genus only by the character of the pubescence.

Specimens examined: Washington—Sentinel Bluffs in gravelly soil, *Cotton* 1345 (type); Priest Rapids, *Brandegee* 77, July 14, 1903. Oregon—near Harper Ranch, *Leiberg* 2103; near Westfall on road to Ontario, *Coville* 504; without locality, *Cusick* in 1885. California—Without locality, *Vasey* in 1880.

Zonal distribution: Upper Sonoran.

The type is in the National Herbarium.

LAVAUXIA.

1. Lavauxia triloba (Nutt.) Spach, Hist. Veg. **4**: 367. 1835.

Oenothera triloba Nutt. Journ. Acad. Phila. **2**: 118. 1821.

Type locality: "In the arid and partly denudated prairies of Red River," Arkansas.

Range: Washington and Saskatchewan, south to California and Mexico.

Specimens examined: Yakima River, *Suksdorf* 1703.

GODETIA.

Calyx tips free in the bud, the lobes separate in anthesis; stigmas oval, purple; capsules sessile.
  Ovary and capsule villous .... 1. *G. quadrivulnera.*
  Ovary and capsule puberulent .... 2. *G. tenella.*
Calyx tips united, remaining so in anthesis; capsules mostly pedicelled.
  Anthers sparsely hairy, large, the terminal portion sterile and often becoming hooked.................................... 3. *G. amoena.*
  Anthers glabrous, small, fertile to the tips..................... 4. *G. caurina.*

1. Godetia quadrivulnera (Dougl.) Spach, Hist. Veg. **4**: 389. 1835.

Oenothera quadrivulnera Dougl. Bot. Reg. **13**: *pl. 1119*. 1827.

Godetia bingensis Suksdorf, Deutsch. Bot. Monatss. **18**: 88. 1900.

Type locality: "Northwest America." Collected by Douglas.

Range: Washington to California in the coast region.

Specimens examined: Fox Island, *Flett* 84; Tacoma, *Flett* 907, 167; Olympia to Gate City, *Heller* 4050; Steilacoom, *Piper* in 1885; *Suckley* in 1885; Bingen, *Suksdorf*, July 4, 1892; June 13, July, 1881; Yelm, *Smith* 428; Puget Sound, *Wilkes Expedition* 133.

Zonal distribution: Humid Transition.

2. Godetia tenella (Cav.) Spach; Steud. Nom. ed. 2. **1**: 697. 1840.

Oenothera tenella Cav. Icon. **4**: 66. *pl. 396*. 1797.

Type locality: "Habitat prope urbem Talcahuano in Chile."

Range: Washington to California. Chile.

Specimens examined: Klickitat County, *Suksdorf* 2152; Clallam County, *Elmer* 2567

3. Godetia amoena (Lehm.) Lilja, Linnaea **15**: 265. 1841.

Oenothera amoena Lehm. Ind. Sem. Hort. Hamb. 8. 1821.

Oenothera lindleyi Dougl. Hook. Bot. Mag. **55**: *pl. 2832*. 1828.

Godetia vinosa Lindl. Bot. Reg. **22**: *pl. 1856*. 1836.

Type locality: "Amer[ica] Septentr[ionalis]."

Range: Washington to California in the coast region.

Specimens examined: Sinclair Inlet, *Piper*, July, 1895; Steilacoom, ***Suckley;*** Skamania County, *Suksdorf* 2129; Chambers Prairie, ***Henderson,*** August, 1892; Johns Island, *Lawrence* 189; Klickitat County, *Suksdorf*, May 27, July 1881 and 23.

Zonal distribution: Humid Transition.

4. Godetia caurina Abrams, sp. nov.

Stems erect, simple below, more or less branched above, 30 to 60 cm. high; herbage minutely and rather sparsely puberulent throughout; leaves linear-lanceolate, entire; flower heads mainly erect, oblong, obtuse at apex, 12 to 14 mm. long; calyx tube 2 mm. long; petals obovate, 15 to 18 mm. long, purple with a blotch of deeper color near the center; anthers 3 mm. long, fertile to the tip, glabrous; stigmas linear-oblong, 3 mm. long, yellow; capsule 8-ribbed, stoutly beaked at apex, 25 mm. long, tapering at base into a pedicel fully half as long.

Nearest *G. amoena* (Lehm.) Lilja from which it is best distinguished by its much smaller glabrous anthers, which are not sterile at tip, and oblong obtuse flower buds.

Type locality: Olympic Mountains, Clallam County, collected by ***Elmer*** 2565, June, 1900 (type, United States National Herbarium, no. 401890).

Specimens examined: Mount Finlayson, Vancouver Island, ***Macoun,*** June 28, 1887; Beacon Hill, Vancouver Island, *Macoun*, May 25, 1887.

Godetia viminea (Dougl.) Spach, Godetia lepida Lindl. Both these names appear in Suksdorf's list, but there are no specimens to indicate that these species occur in Washington. The species of this genus are very poorly understood.

BOISDUVALIA.

Upper leaves much broader than the lower ones; capsule septifragal in dehiscence .... 1. ***B. densiflora.***

Upper leaves not broader than the lower ones; capsule loculicidal in dehiscence.

  Leaves narrowly lanceolate, pubescent .... 2. ***B. stricta.***

  Leaves ovate-lanceolate, often glabrous .... 3. ***B. glabella.***

1. Boisduvalia densiflora (Lindl.) S. Wats. in Brewer & Wats. Bot. Cal. **1: 233. 1876.**

Boisduvalia douglasii Spach, Hist. Veg. **4**: 385. 1835.

Oenothera densiflora Lindl. Bot. Reg. **19**: *pl. 1593.* 1833.

Type locality: Northern California.

Range: British Columbia to California and Nevada.

Specimens examined: Seattle, *Piper*, July, 1897; Ellensburg, *Whited* 573; west Klickitat County, *Suksdorf* 2254; Leavenworth, *Whited* 248; Falcon Valley, ***Suksdorf*** 557; Peshastin, *Sandberg & Leiberg* 588; Spokane, *Piper*, October 1, 1900; Pullman, ***Hull,*** July 16, 1892; *Piper*, 1839; Ellensburg, *Cotton* 866.

Zonal distribution: Transition and Upper Sonoran.

1a. Boisduvalia densiflora pallescens Suksdorf, Deutsch. Bot. Monatss. **18: 88. 1900.**

Type locality: Near Bingen, Klickitat County, Washington.

Specimens examined: Near Bingen, *Suksdorf.*

Distinguished by having white flowers and somewhat larger seeds.

2. Boisduvalia stricta (A. Gray) Greene, Fl. Fran. 225. 1891.

Gayophytum strictum A. Gray, Proc. Am. Acad. **7**: 340. 1867.

Boisduvalia torreyi S. Wats. in Brewer & Wats. Bot. Cal. **1: 233. 1876.**

Oenothera torreyi S. Wats. Proc. Am. Acad. **8**: 384. 1873.

Type locality: Cloverdale, California.

Range: Washington and Idaho to California.

Specimens examined: Seattle, *Smith* 411; Falcon Valley, *Suksdorf* 378, 558; foothills Blue Mountains, *Horner* 176; Blue Mountains, *Horner*, August, 1896; Spokane, *Piper*, June, 1897, *Sandberg, McDougal, & Heller*, 905; Pullman, *Henderson* 2470; *Piper* 2657; 2655; Wawawai, *Elmer* 757; *Piper*, June 23, 1901; Squaw Creek, *Cotton* 877; Rattlesnake Mountains, *Cotton* 690.

Zonal distribution: Transition.

3. **Boisduvalia glabella** (Nutt.) Walp. Repert. **2**: 89. 1843.

Oenothera glabella Nutt.; Torr. & Gr. Fl. **1**: 505. 1840.

Type locality: "Plains of the Oregon east of Wallawallah." Collected by Nuttall.

Range: British Columbia to Montana and California.

Specimens examined: Pullman, *Piper* 2656; *Hull*, July, 1892.

Zonal distribution: Arid Transition.

CLARKIA.

Petals entire.. 1. *C. rhomboidea.*
Petals 3-lobed... 2. *C. pulchella.*

1. **Clarkia rhomboidea** Dougl.; Hook. Fl. Bor. Am. **1**: 214. 1833.

Type locality: "From the Great Falls of the Columbia to the Rocky Mountains." Collected by Douglas.

Range: Washington and Idaho to Nevada and California.

Specimens examined: Wenache Region, *Brandegee* 780; Wenache Gulch, *Whited* 1165; Klickitat River, *Flett* 1234; Cascade Mountains, *Mrs. Steinweg* in 1894; Stehekin, *Whited*, July 5, 1901; Loon Lake, *Winston*, July 20, 1897; without locality, *Vasey* 238; without locality, *Lyall* in 1861; Blue Mountains, *Piper*, July, 1896.

Zonal distribution: Arid Transition.

2. **Clarkia pulchella** Pursh, Fl. **1**: 260. 1814.

Type locality: "On the Kooskooskee and Clark's Rivers." Collected by Lewis. The first locality is in Idaho, opposite the town of Kamiah, the Camp Chopunnish, where Lewis collected many plants.

Range: Washington and Idaho to California.

Specimens examined: North Yakima, *Mrs. Steinweg* in 1894; Pasco, *Hindshaw* 38; Columbia River, latitude 46° to 49°, *Lyall* in 1861; between Coulee City and Waterville, *Spillman*, May, 1896; Sprague, *Henderson*, May, 1892; *Sandberg & Leiberg* 211; Tukanon River, *Lake & Hull* 531; Pullman, *Piper* 1630; Tampico, *Flett* 1232; Colville Reservation, *Griffiths & Cotton* 376.

Zonal distribution: Arid Transition and Upper Sonoran.

HALORAGIDACEAE. Water Milfoil Family.

Stamen 1; ovary 1-celled.. Hippuris.
Stamens 2 to 8; ovary 2 to 4-celled.................................. Myriophyllum.

HIPPURIS. Marestail.

Alpine plant 2 to 5 cm. high.. 1. *H. montana.*
Lowland plant 20 to 50 cm. high....................................... 2. *H. vulgaris.*

1. **Hippuris vulgaris** L. Sp. Pl. **1**: 4. 1753.

Type locality: European.

Range: Arctic regions, southward to California, New Mexico, and Maine. Europe, Asia.

SPECIMENS EXAMINED: Oyhut, *Lamb* 1254; **Lake Cushman,** ***Piper*** **2225; Whidby Island,** *Gardner* 350; Admiralty Head, *Piper*, May, 1898; **Seattle,** ***Piper;*** **Longmire Springs,** *Piper*, August, 1895; Columbia Valley, *Lyall*.

ZONAL DISTRIBUTION: Transition.

2. **Hippuris montana** Ledeb.; Reichenb. Ic. Fl. Germ. **1**: 76. *pl. 86. f. 181*. 1823.

TYPE LOCALITY: "Unalaschka."

RANGE: Alaska to Washington.

SPECIMENS EXAMINED: Olympic Mountains, *Piper*, August, 1895; **Mount Rainier,** *Allen* 186; *Piper* 2136; Stevens Pass, *Sandberg & Leiberg* 792.

ZONAL DISTRIBUTION: Hudsonian.

MYRIOPHYLLUM. WATER MILFOIL.

Floral leaves shorter than the flowers................................ 1. *M. spicatum*.
Floral leaves longer than the flowers.
  Stamens 8; floral leaves pectinate................................ 2. *M. verticillatum*.
  Stamens 3 or 4; floral leaves denticulate................................ 3. *M. hippuroides*.

1. **Myriophyllum spicatum** L. Sp. Pl. **2**: 992. 1753.

TYPE LOCALITY: European.

RANGE: British Columbia to Newfoundland, southward to California and Florida.

SPECIMENS EXAMINED: Lake Cushman, *Piper* 2230; Seattle, *Piper* 1132; **Yakima** region, *Brandegee* 776; Ellensburg, *Hindshaw*.

2. **Myriophyllum verticillatum** L. Sp. Pl. **2**: 992. 1753.

TYPE LOCALITY: European.

RANGE: Washington to Canada, southward to California and Florida.

SPECIMENS EXAMINED: Segualiche Lake, *Piper*, May, 1888; Lake Chelan, *Elmer*, August, 1897; Parker, *Dunn*, August 8, 1901; Lake Chelan, *Gorman* in 1897; **Tacoma,** ***Flett*** **2146;** Lake Crescent, *Lawrence* 310.

3. **Myriophyllum hippuroides** Nutt.; Torr. & Gr. Fl. **1**: 530. 1840.

TYPE LOCALITY: "Oregon, in ponds of the Wahlamet." Collected by Nuttall.

RANGE: Washington to California.

SPECIMENS EXAMINED: West Klickitat County, *Suksdorf* 2176; Lindsleys, Clarke County, *Henderson*.

ARALIACEAE. GINSENG FAMILY.

Herb; leaves compound................................ ARALIA.
Shrub; leaves simple................................ ECHINOPANAX.

ARALIA.

1. **Aralia nudicaulis** L. Sp. Pl. **1**: 274. 1753.

TYPE LOCALITY: "In Virginia."

RANGE: Washington to Newfoundland, Missouri, and North Carolina.

SPECIMENS EXAMINED: Mount Carlton, *Kreager* 206.

ECHINOPANAX.

1. **Echinopanax horridum** (Smith) Dec. & Planch. in Rev. Hortic. **3**: 105. 1854.
DEVIL'S CLUB.

Panax horridum Smith, Rees' Cycl. **26**: No. 10. 1812.
Aralia erinacea Hook. Edinb. Journ. Sci. **6**: 64. 1827.
Fatsia horrida Benth. & Hook. Gen. Pl. **1**: 939. 1867.

TYPE LOCALITY: Nootka Sound. Collected by Menzies.

RANGE: Alaska to California and the Blue Mountains, Lake Superior.

SPECIMENS EXAMINED: Seattle, *Piper*, June, 1891; upper Valley Nisqually, *Allen* 116; near Skagit Pass, *Lake & Hull* 772; Stampede Pass, *Henderson*, October 4, 1892; Stevens Pass, *Sandberg & Leiberg* 753; Yakima Pass, *Watson*, November 19, 1880; Blue Mountains, *Piper*, July, 1896; *Horner;* Clallam County, *Elmer* 2508; Big Meadow, *Kreager* 424; without locality, *Vasey* in 1889.

ZONAL DISTRIBUTION: Humid Transition and Canadian.

APIACEAE. CELERY FAMILY.

- Flowers in dense heads; fruit scaly or tuberculate .... ERYNGIUM (p. 414).
- Flowers in umbels.
  - Fruit more or less bristly.
    - Bristles hooked covering the whole fruit surface .... SANICULA (p. 414).
    - Bristles only on the ribs of the fruit.
      - Stylopodium obsolete; bristles barbed at tip ... DAUCUS (p. 415).
      - Stylopodium conical; bristles not barbed.
        - Carpels oblong or ovate .... CAUCALIS (p. 416).
        - Carpels linear .... WASHINGTONIA (p. 416).
  - Fruit glabrous, not at all bristly.
    - Carpels strongly flattened dorsally.
      - Stylopodium conical; petals obcordate .... HERACLEUM (p. 417).
      - Stylopodium flat or obsolete.
        - Calyx teeth evident; stylopodium flat..... CYNOMARATHRUM (p. 417).
        - Calyx teeth obsolete or nearly so; stylopodium obsolete.
          - Plant caulescent and branching; flowers white.
            - Ultimate segments of the leaves large .... ANGELICA (p. 418).
            - Ultimate segments of the leaves small .... CONIOSELINUM (p. 419).
          - Plants acaulescent; or, if caulescent, flowers not white.
            - Mostly acaulescent; lateral ribs thin .... LOMATIUM (p. 419).
            - Mostly caulescent; lateral ribs thick .... LEPTOTAENIA (p. 425).
    - Carpels not dorsally flattened.
      - Oil tubes present; leaves not peltate.
        - Fruit with a single oil tube in each interval.
          - Stylopodium conical.
            - Leaflets linear .... CARUM (p. 426).
            - Leaflets lanceolate to ovate ...... CICUTA (p. 426).
          - Stylopodium flat or obsolete.
            - Flowers yellow; leaves simple or trifoliolate .... ZIZIA (p. 427).
            - Flowers white.
              - Fruit elongate .... LEIBERGIA (p. 427).
              - Fruit short.
                - Leaves decompound .... OENANTHE (p. 427).
                - Leaves reduced to hollow petioles .... LILAEOPSIS (p. 428).
        - Fruit with more than one oil tube in each interval.

Stylopodium conical.
Fruit globose.................... BERULA (p. 428).
Fruit oblong.................... LIGUSTICUM (p. 428).
Stylopodium flat or obsolete.
Ribs of the fruit wing-like.
Wings thick and corky; flowers white.................... GLEHNIA (p. 429).
Wings thin; flowers yellow .. PTERYXIA (p. 429).
Ribs of the fruit not wing-like.
Plants acaulescent.
Fruit with all the ribs filiform; root not tuberous HESPEROGENIA (p. 430).
Fruit with the dorsal ribs filiform, the lateral ones corky; root tuberous.. OROGENIA (p. 430).
Plants caulescent; ribs of the fruit all thick and corky.
Leaflets linear or narrowly lanceolate........... SIUM (p. 430).
Leaflets ovate.......... COELOPLEURUM (p. 430).
Oil tubes obsolete or very obscure; leaves peltate. HYDROCOTYLE (p. 431).

ERYNGIUM.

Bractlets little longer than the pale blue heads...................... 1. *E. articulatum.*
Bractlets twice as long as the green heads.......................... 2. *E. petiolatum.*

1. Eryngium articulatum Hook. Lond. Journ. Bot. **6**: 232. 1847.

Eryngium harknessii Curran, Bull. Cal. Acad. **1**: 153. 1885.

TYPE LOCALITY: "Stony edges of the Spokane River, and Skitsoë and Coeur d'Alene Lakes." Collected by Geyer. The first locality is probably in Washington; the others are in Idaho.

RANGE: From northern Idaho, through Washington and Oregon to central California.

SPECIMENS EXAMINED: Spokane, *Spalding;* White Salmon, *Suksdorf;* Pullman, *Piper* 1559 and October 10, 1897; without locality, *Geyer* 583.

The specimens reported[a] as collected at Olympia by *Henderson* 2518, 2519, are really from Eastern Washington.

ZONAL DISTRIBUTION: Arid Transition.

2. Eryngium petiolatum Hook. Fl. Bor. Am. **1**: 259. 1833.

Eryngium petiolatum juncifolium A. Gray, Proc. Am. Acad. **8**: 385. 1872.

TYPE LOCALITY: "Moist soils on the plains of the Multnomah [Willamette] River," Oregon. Collected by Douglas.

RANGE: Western Oregon to Klickitat County, Washington.

SPECIMENS EXAMINED: White Salmon, *Suksdorf;* Columbia Plains, *Nuttall* [Oregon or Washington?].

SANICULA.

Mature fruit stipitate; leaves palmately divided.................. 1. *S. menziesii.*
Mature fruit sessile, not stipitate.
Leaves pinnately parted, the segments incised................ 4. *S. bipinnatifida.*
Leaves palmately divided.
Principal leaf divisions confluent at base................. 2. *S. howellii.*
Principal leaf divisions distinct at base.................. 3. *S. septentrionalis.*

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[a] Contr. Nat. Herb. 7: 52. 1900.

1. **Sanicula menziesii** Hook. & Arn. Bot. Beech. 142. 1832.

Sanicula nudicaulis Hook. & Arn. Bot. Beech. Voy. 347. 1839–40.

Type locality: Not given, but California according to Hooker.[a]

Range: British Columbia to California near the coast.

Specimens examined: Port Ludlow, *Binns;* Seattle, *Piper,* July, 1895; *Smith* 643; Olympia, *Kincaid,* July, 1896; west Klickitat County, *Suksdorf;* McAllisters Lake, *Henderson,* June, 1892.

Zonal distribution: Humid Transition.

2. **Sanicula howellii** Coult. & Rose, Bot. Gaz. **13**: 81. 1888.

Type locality: "Sandy shores, Tilamook Bay and Ocean Beach, Oregon." Collected by Howell.

Range: Sea coast of Oregon to Vancouver Island.

Specimens examined: Orcas Island, *Lyall;* Whidby Island, *Gardner;* Granville, *Conard* 173.

Zonal distribution: Humid Transition.

3. **Sanicula septentrionalis** Greene, Erythea **1**: 6. 1893.

Sanicula divaricata Greene, Erythea **3**: 64. 1895.

Type locality: "Chase River, Vancouver Island." Collected by Macoun.

Range: From northern California to Vancouver Island and western Montana.

Specimens examined: Tacoma, *Flett* 21; Olympic Mountains, *Elmer* 2772; Skamania County, *Flett* 1301; Goat Mountains, *Allen* 254; White Salmon River, *Suksdorf* 276; Little Klickitat River, *Henderson* 2577; Blue Mountains, *Piper* 2338.

Zonal distribution: Transition and Canadian.

This species was formerly confused with the more southern *S. nevadensis* S. Wats.

4. **Sanicula bipinnatifida** Dougl.; Hook. Fl. Bor. Am. **1**: 258. *pl. 92.* 1834.

Type locality: "Fort Vancouver on the Columbia." Collected by Douglas and Scouler.

Range: From Vancouver Island to southern California, and extending into Lower California.

Specimens examined: Whidby Island, *Gardner* 137; Puget Sound, *Cooper.*

Zonal distribution: Humid Transition.

Sanicula marilandica, L. has been reported from "undulating gravelly soils, near Fort Vancouver, Douglas."[b] Not since seen in Washington, but it occurs in northern Idaho.

Sanicula bipinnata Hook. & Arn. was found on "Prairie near Steilacoom" by Cooper, according to Torrey.[c] Probably some related species was mistaken for it.

DAUCUS.

1. **Daucus pusillus** Michx. Fl. **1**: 164. 1803. Wild carrot.

Daucus pusillus microphyllus Torr. & Gr. Fl. **1**: 636. 1840.

Daucus pusillus scaber Torr. & Gr. loc. cit.

Type locality: "In campestribus Carolinae."

Range: From the Carolinas and Florida to California, thence northward to Vancouver Island.

Specimens examined: Orchard Point, *Piper* 2010; Whidby Island, *Gardner* 132; East Sound, *Henderson,* July 3, 1892; Port Ludlow, *Binns;* Seattle, *Piper;* Fidalgo City, *Flett* [illegible] [illegible]llam County, *Elmer* 2770; Klickitat County, *Suksdorf,* June, 1881.

distribution: Transition.

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[a] Fl. Bor. Am. **1**: 258. 1834.

[b] Hook. Fl. Bor. Am. **1**: 257. 1834.

[c] Pac. R. Rep. **12**^{2}: 62. 1860.

CAUCALIS.

1. **Caucalis microcarpa** Hook. & Arn. Bot. Beech. Voy. 348. 1839–40.

TYPE LOCALITY: California. Collected by Douglas.

RANGE: From Washington and Idaho to southern California and Arizona, and extending into Mexico.

SPECIMENS EXAMINED: Clallam County, *Elmer* 2766; Almota, *Piper*, May 2, 1897; Wawawai *Elmer* 93; *Piper* 1890, May 19, 1894; *Lake* 706; Klickitat County, *Suksdorf* 16.

ZONAL DISTRIBUTION: Transition.

WASHINGTONIA.

- Fruit with bristly ribs.
  - Flowers purple .... 1. *W. purpurea.*
  - Flowers white.
    - Foliage strigose-pubescent .... 2. *W. brevipes.*
    - Foliage glabrous or nearly so.
      - Fruit with a conspicuous sharp beak .... 3. *W. divaricata.*
      - Fruit constricted below the apex and with truncate tip... 4. *W. leibergi.*
- Fruit glabrous.
  - Rays erect in fruit.. 5. *W. occidentalis.*
  - Rays spreading in fruit... 6. *W. ambigua.*

1. **Washingtonia purpurea** Coult. & Rose, Contr. Nat. Herb. 7: 67. 1900.

TYPE LOCALITY: "Sitka, Alaska."

RANGE: Mountains of northern Oregon to Alaska.

SPECIMENS EXAMINED: Chehalis County, *Lamb* 1382.

2. **Washingtonia brevipes** Coult. & Rose, Contr. Nat. Herb. 7: 66. 1900.

TYPE LOCALITY: "Mount Shasta and vicinity, Siskiyou County, Cal." Collected by Palmer.

RANGE: From northern Washington and adjacent Idaho to southern California.

SPECIMENS EXAMINED: Seattle, *Piper* 110; *Smith* 110; Chehalis County, *Heller* 3975; Whidby Island, *O. Piper*, May, 1898; Tacoma, *Flett* 63; Wenache Mountains, *Whited* 467; Roslyn, *Whited* 467; Mount Stuart, *Elmer* 1176; Falcon Valley, *Suksdorf* 2115; Blue Mountains, *Horner* 215; Clarks Springs, Spokane County, *Kreager* 44; Clallam County, *Elmer* 2774; Stuart Island, *Lawrence* 56.

ZONAL DISTRIBUTION: Transition.

3. **Washingtonia divaricata** Britton Ill. Fl. 2: 531. 1897.

Washingtonia intermedia Rydberg, Mem. N. Y. Bot. Gard. 1: 289. 1900.

Osmorhiza divaricata Nutt.: Torr. & Gr. Fl. 1: 639. 1840, nom. nud.; Britt. & Br. Ill. Fl. 2: 531. 1897, as synonym.

TYPE LOCALITY: "Oregon." Collected by Nuttall.

RANGE: From Oregon and northern California to South Dakota, and northward to Alaska.

SPECIMENS EXAMINED: Puget Sound, *Wilkes Expedition* 365; Silverton, *Bouck* 85; Nisqually Valley, *Allen* 34; Olympia, *Henderson* 376; Yakima County, *Henderson* 376; Rock Creek, Spokane County, *Suksdorf* 1195; Spokane, *F. W. Dewart;* Tukanon River, *Lake & Hull* 764; without locality, *Vasey* 306; Cape Horn, *Piper* 4979; Klickitat River, *Cotton* 1180.

ZONAL DISTRIBUTION: Transition.

4. **Washingtonia leibergi** Coult. & Rose, Contr. Nat. Herb. 7: 66. 1900.

TYPE LOCALITY: "Nason Creek, branch of Wenatchee River, Kittitas County, Washington." Collected by Sandberg & Leiberg.

RANGE: Mountains of Washington and Idaho.

SPECIMENS EXAMINED: Olympic Mountains, *Piper* 911; Mount Adams, *Suksdorf* 1194; Nason Creek, *Sandberg & Leiberg* 666.

5. **Washingtonia occidentalis** (Nutt.) Coult. & Rose, Contr. Nat. Herb. 7: 67. 1900.
Glycosma occidentalis Nutt. in Torr. & Gr. Fl. 1: 639. 1840.
Osmorhiza occidentalis Nutt.; Torr. Bot. Mex. Bound. 71. 1859.
TYPE LOCALITY: "Western side of the Blue Mountains of Oregon." Collected by Nuttall.
RANGE. From Alberta to northern California and the mountains of Colorado.

SPECIMENS EXAMINED: Wenache Mountains, *Whited* 1413; Simcoe Mountains, *Howell;* Blue Mountains, *Piper* 2334; *Nuttall;* without locality, *Vasey* 304; Roslyn, *Whited* 465; near Wenache, *Whited* 7; Easton, *Henderson,* June 11, 1892; Mount Carlton, *Kreager* 282; Wenache Mountains, *Cotton* 1681.

ZONAL DISTRIBUTION: Canadian.

6. **Washingtonia ambigua** (A. Gray) Coult. & Rose, Contr. Nat. Herb. 7: 69. 1900.
Glycosma ambiguum A. Gray, Proc. Am. Acad. 8: 386. 1872.
Osmorhiza ambigua Coult. & Rose, Rev. N. A. Um. 119. 1888.
TYPE LOCALITY: "Foot of Cascade Mountains, Oregon." Collected by Hall.
RANGE: Mountains of Oregon and Washington.

SPECIMENS EXAMINED: Goat Mountains, *Allen* 256; Mount Adams, *Henderson* in 1892; Falcon Valley, *Suksdorf* 382; foothills near Ellensburg, *Piper,* May, 1897; Peshastin, *Sandberg & Leiberg* 502; upper Atanum River, *Henderson,* August 2, 1892.

ZONAL DISTRIBUTION: Canadian.

OSMORHIZA LONGISTYLIS (Torr.) DC. is reported in Hooker[a] as found by Douglas in "Shady woods, North-West America, in the lat. of the Columbia." Some related species is doubtless here confused.

OSMORHIZA BREVISTYLIS DC. is reported in Hooker[b] as found "From the mouth of the Columbia to Observatory Inlet, in lat. 55°, North-West America," the specimens collected by *Scouler* and *Douglas.* Here again some related species has probably been confused.

HERACLEUM.

1. **Heracleum lanatum** Michx. Fl. Bor. Am. 1: 166. 1803. COW PARSNIP.
Heracleum douglasii DC. Prod. 4: 193. 1830.
Heracleum lanatum vestitum Torr. & Gr. Fl. 1: 632. 1840.
TYPE LOCALITY: "Canada."

RANGE: Wet ground from Canada to North Carolina and Tennessee, and extending westward to New Mexico, California, and Alaska.

SPECIMENS EXAMINED: Fidalgo Island, *Lyall* in 1858; Silverton, *Bouck;* Skagit Pass, *Lake & Hull* 538; Skokomish Valley, *Kincaid,* June 10, 1892; Cascade Mountains, *Lyall;* Pullman, *Piper* 1558; Roslyn, *Whited* 466; North Palouse River, *Vasey,* June 6, 1901; Spokane County, Clarks Springs, *Kreager* 139; Spokane River, *Wilkes Expedition* 397; Olympic Mountains, *Elmer* 2763; *Piper* in 1895; Seattle, *Piper.*

ZONAL DISTRIBUTION: Transition to Hudsonian.

Abundant in moist soil in most parts of the State. Douglas records that the "roots and young stems are eaten by Chenook Indians."

CYNOMARATHRUM.

1. **Cynomarathrum brandegei** Coult. & Rose, Contr. Nat. Herb. 7: 246. 1900.
Peucedanum brandegei Coult. & Rose, Bot. Gaz. 13: 210. 1888.
TYPE LOCALITY: "Walla Walla region, Washington." Collected by Brandegee.
RANGE: Eastern Washington.

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[a] Fl. Bor. Am. 1: 271 1834.

[b] Fl. Bor. Am. 1: 272. 1834.

Specimens examined: Stehekin, *Whited* 1388; without locality, *Vasey* 296, 299; Peshastin, *Sandberg & Leiberg* 516; Wellington, *Savage* 18; Cascade Mountains, lat. 49°, *Lyall* in 1860; Bridge Creek, *Elmer* 651; Mount Stuart, *Elmer* 116; Walla Walla region, *Brandegee* 799; Stehekin, *Griffiths & Cotton* 236.

Zonal distribution: Arid Transition.

ANGELICA.

Oil tubes in pairs in the lateral intervals.............................. 1. *A. canbyi.*
Oil tubes solitary in all the intervals.
  Leaves densely tomentose beneath.......................... 2. *A. hendersoni.*
  Leaves glabrous or nearly so.
    Involucels of numerous bractlets............................ 3. *A. genuflexa.*
    Involucels usually wanting.
      Fruit 6 to 8 mm. long with lateral wings thick and corky.. 4. *A. arguta.*
      Fruit 4 to 6 mm. long, the lateral wings not thick and corky. 5. *A. lyallii.*

1. **Angelica canbyi** Coult. & Rose, Rev. N. A. Umb. 40. 1888.

Type locality: "Low grassy ground along streams, Klickitat River, near Mount Adams," Washington. Collected by Suksdorf.

Range: Eastern Washington.

Specimens examined: Wenache Mountains, *Whited* 1410, 1188; Ellensburg, *Whited* 533; Atanum Soda Springs, *Watt*, August, 1895; Mount Adams, *Suksdorf* 638; near Mount Paddo, *Suksdorf* 763; Blue Mountains, *Piper* 2335; *Horner* 302; Touchet River, *Horner* 301; without locality, *Vasey* 301; without locality, *Brandegee* 796½; Alkali Lake, *Sandberg & Leiberg* 420.

Zonal distribution: Arid Transition and Canadian.

2. **Angelica hendersoni** Coult. & Rose, Bot. Gaz. 13: 80. 1888.

Type locality: "Bluffs moistened by sea spray, Long Beach, Ilwaco (Pacific County), Washington." Collected by Henderson.

Range: Seacoast, from southern Washington to San Francisco.

Specimens examined: Ilwaco, *Henderson*, September 7, 1892; Nahcotta, *Brodie* in 1900.

Zonal distribution: Humid Transition.

3. **Angelica genuflexa** Nutt.: Torr. & Gr. Fl. 1: 620. 1840.

Archangelica peregrina Nutt.: Torr. & Gr. Fl. 1: 622. 1840.

Type locality: Wappatoo Island, [Oregon] and near Fort Vancouver [Washington]. Collected by Nuttall.

Range: From Oregon to southern Alaska, west of the Cascade Mountains.

Specimens examined: Port Ludlow, *Binns* in 1890; Montesano, *Heller* 4035a; West Seattle, *Piper* 628 and August 3, 1889; Tacoma, *Flett* 167; upper Valley Nisqually, *Allen* 36; Skamania County, *Suksdorf*; Falcon Valley, *Suksdorf* 187; Sumas, *Lyall*; Mount Adams, *Suksdorf* 627, 186; Olympic Mountains, *Elmer* 2765.

Zonal distribution: Humid Transition.

4. **Angelica arguta** Nutt.: Torr. & Gr. Fl. 1: 620. 1840.

Type locality: "Wappatoo Island [Oregon] and near Fort Vancouver [Washington]." Collected by Nuttall.

Specimens examined: Type specimen of Nuttall in the Herbarium of the New York Botanical Garden.

This species is known only from the original specimens of Nuttall. Unless these represent some unusual condition of *A. lyallii* it is difficult to understand why the species has not been found since by the numerous botanists who have collected in and about the type locality.

5. **Angelica lyallii** S. Wats. Proc. Am. Acad. **17**: 374. 1882.

TYPE LOCALITY: "In the Galton and Cascade Mountains, near the British boundary." Collected by Lyall.

RANGE: In the mountains, from eastern Oregon to northwestern Wyoming and northward to Alberta.

SPECIMENS EXAMINED: Olympic Mountains, *Piper* 2023; Mount Rainier, *Piper* in 1890; *Allen;* upper Valley Nisqually, *Allen;* Stampede Pass, *Henderson* in 1892; Mount Adams, *Suksdorf* 636; Falcon Valley, *Howell* in 1882; *Suksdorf* 128; without locality, *Brandegee* 796; Cascade Mountains, latitude 49°, *Lyall*; Horseshoe Basin, *Elmer* 855; Blue Mountains, *Piper* 2336, August 2, 1896; Dry Creek, Whitman County *Vasey*, July 30, 1901; Clealum Creek, *Cotton* 830.

ZONAL DISTRIBUTION: Canadian and Hudsonian.

ANGELICA sp. An undescribed species of Angelica occurs on Mount Adams, of which immature specimens have been collected by Henderson. It has been referred erroneously to *A. kingii* (*Selinum kingii* S. Wats.) to which it is perhaps nearest related.

CONIOSELINUM.

1. **Conioselinum gmelini** (Cham. & Schlecht.) Coult. & Rose, Contr. Nat. Herb. **7**: 150. 1900.

Ligusticum gmelini Cham. & Schlecht. Linnaea **1**: 391. 1826.

Selinum benthami S. Wats. Bibl. Index 432. 1878.

Selinum hookeri S. Wats.; Coult. & Rose, Rev. N. A. Umb. 45. 1888.

Conioselinum fischeri Auct. Amer.

TYPE LOCALITY: "Unalaska."

RANGE: From Alaska and Northwest Territory southward to the Columbia River along the coast.

SPECIMENS EXAMINED: Mason County, *Piper* July, 1890, 631; Port Ludlow, *Binns* in 1890; Seattle, *Piper* in 1888; Tacoma, *Flett* 131; Steilacoom, *Suckley;* Ilwaco, *Henderson* 2160; Straits of De Fuca, *Scouler;* Puget Sound, *Wilkes Expedition* 7.

ZONAL DISTRIBUTION: Humid Transition.

In Cooper's report this plant was referred to *Conium maculatum* L. and spoken of by Torrey as "the large form of the northwest coast."

LOMATIUM.

- Low plants arising from thick tubers.
  - Flowers white; tubers globose.
    - Fruit puberulent .... 1. *L. gormani.*
    - Fruit glabrous.
      - Oil tubes none; tubers often moniliform..... 2. *L. geyeri.*
      - Oil tubes present.
        - Tubers large; oil tubes solitary in the intervals .... 3. *L. canbyi.*
        - Tubers small; oil tubes several in each interval.
          - Pedicels slender, longer than the fruits .... 4. *L. farinosum.*
          - Pedicels stout, much shorter than the fruits .... 5. *L. piperi.*
  - Flowers yellow; tubers elongate.
    - Fruit puberulent.
      - Oil tubes 3 to 6 in each interval............ 6. *L. watsoni.*
      - Oil tubes solitary in the intervals........... 7. *L. cous.*
    - Fruit glabrous; oil tubes solitary in the intervals. 8. *L. circumdatum.*

- Taller plants, the roots elongate, hardly tuberous.
  - Peduncles stout, often much swollen at the summit.
    - Fruit very large, 18 to 28 mm. long; leaf segments narrow .... 9. *L. suksdorfii.*
    - Fruit smaller 8 to 14 mm. long.
      - Leaf segments lanceolate .... 10. *L. nudicaule.*
      - Leaf segments ovate to orbicular .... 11. *L. platyphyllum.*
  - Peduncles less stout, never swollen at the top.
    - Bractlets conspicuous.
      - Flowers yellow; leaves glabrous .... 12. *L. utriculatum.*
      - Flowers white.
        - Herbage tomentose .... 13. *L. macrocarpum.*
        - Herbage puberulent .... 14. *L. artemisiarum.*
    - Bractlets small or wanting.
      - Fruit linear; flowers long-pedicelled .... 15. *L. ambiguum.*
      - Fruit oblong.
        - Leaves pinnate.
          - Oil tubes solitary in the intervals... 16. *L. martindalei.*
          - Oil tubes 3 in each interval .... 17. *L. hallii.*
        - Leaves ternate.
          - Wings of the fruit broad.
            - Ill-scented, the leaves finely dissected .... 21. *L. grayi.*
            - Not ill-scented, the leaves not finely dissected .... 18. *L. laevigatum.*
          - Wings of the fruit narrow.
            - Ovaries glabrous .... 19. *L. triternatum.*
            - Ovaries puberulent.
              - Leaf segments lanceolate, elongate, usually entire... 20. *L. robustius.*
              - Leaf segments oblong, rather short, often toothed ...... 22. *L. brevifolium.*

1. Lomatium gormani (Howell) Coult. & Rose, Contr. Nat. Herb. **7**: 208. 1900.

Peucedanum gormani Howell, Fl. N. W. Am. **1**: 252. 1898 (April 1).

Peucedanum confusum Piper. Erythea **6**: 29. 1898 (April 10.)

TYPE LOCALITY: On "high hills opposite The Dalles," Washington. Collected by Howell.

RANGE: Eastern Oregon, eastern Washington, and adjacent Idaho.

SPECIMENS EXAMINED: Wenache Mountains, *Whited* 60; North Yakima, *Mrs. Steinweg* in 1894; Klickitat, *Howell* 411; Rock Creek, *Sandberg & Leiberg* 84; Pullman, *Piper* 1565; *Elmer* 73; Wawawai, *Piper* 1566; Colfax, *Vasey*, April 13, May 5, 1902; Waitsburg, *Horner* 4; Spokane County, *Leiberg* 750; Klickitat Hills, *Gorman*, April, 1895.

ZONAL DISTRIBUTION: Arid Transition.

2. Lomatium geyeri (S. Wats.) Coult. & Rose, Contr. Nat. Herb. **7**: 209. 1900.

Peucedanum geyeri S. Wats. Proc. Am. Acad. **14**: 293. 1879.

Peucedanum vittatum Coult. & Rose, Bot. Gaz. **14**: 277. 1889.

TYPE LOCALITY: "Sandy woods and plains, upper Columbia River; the biscuit-root of the Indians." Collected by Geyer, no. 458, probably along the lower Spokane River.

RANGE: Eastern Washington and northern Idaho.

SPECIMENS EXAMINED: Wenache, *Whited* 1007 and May 17, 1896; Badger Mountain, *Whited*, April 22, 1900; Roslyn, *Whited*, April 25, 1898; Ellensburg, *Whited* 270; *Piper*, May 20, 1897; Fort Colville, *Lyall* in 1861; Spokane, *Piper* 2300, 2941, 2697; *Henderson* 2502; Hangman Creek, *Sandberg & Leiberg* 7; Ellensburg, *Vasey* in 1889.

ZONAL DISTRIBUTION: Arid Transition and Upper Sonoran.

3. **Lomatium canbyi** Coult. & Rose, Contr. Nat. Herb. **7**: 210. 1900.

Peucedanum canbyi Coult. & Rose, Bot. Gaz. **13**: 78. 1888.

Type locality: "High ridges, E. Oregon." Collected by Howell.

Range: Eastern Oregon, eastern Washington, and Idaho.

Specimens examined: Wenache, *Whited* 287; Ellensburg, *Whited* 287, 258 and May 4, 1898; North Yakima, *Mrs. Steinweg* in 1894; Klickitat Valley, *Howell* 1367, 67; near Columbus, *Suksdorf*, April 13, 1886; Davenport, *Geo. R. Sawyer*, April 13, 1901; Rattlesnake Mountains, *Cotton* 567; Klickitat Hills, *Gorman*, April, 1895.

Zonal distribution: Arid Transition and Upper Sonoran.

4. **Lomatium farinosum** (Geyer) Coult. & Rose, Contr. Nat. Herb. **7**: 210. 1900.

Peucedanum farinosum Geyer; Hook. Lond. Journ. Bot. **6**: 235. 1847.

Ferula farinosa Geyer; Hook. Lond. Journ. Bot. loc. cit.

Type locality: "On an isolated rock in the Coeur d' Aleine Mountains on wet clay." Collected by Geyer.

Range: Eastern Washington and Idaho.

Specimens examined: Pine City, *Piper*, May 6, 1898; Rock Lake, *Sandberg & Leiberg*, May, 1893; Rock Creek, *Sandberg & Leiberg* 131; near Spangle, *Piper*, May 31, 1901; Almota, *Piper* 2794; Wawawai, *Elmer* 98; *Piper* 1567; Coulee City, *Piper* 3874; North Palouse River, *Vasey*, May 25, 1902.

Zonal distribution: Arid Transition.

5. **Lomatium piperi** Coult. & Rose, Contr. Nat. Herb. **7**: 211. 1900.

Type locality: "Ellensburg, Kittitas County, Wash." Collected by G. R. Vasey.

Range: From the mountains of northern California to Washington.

Specimens examined: Klickitat Valley, *Howell*, February 15, May, 1878; Klickitat River, *Flett* 1304; White Salmon, *Suksdorf* 278; Klickitat Hills, *Gorman*, April, 1895.

Zonal distribution: Arid Transition.

6. **Lomatium watsoni** Coult. & Rose, Contr. Nat. Herb. **7**: 211. 1900.

Peucedanum watsoni Coult. & Rose, Bot. Gaz. **13**: 209. 1888.

Type locality: "Simcoe Mts.," Yakima County, Wash. Collected by Howell.

Range: Mountains of Oregon and Washington.

Specimens examined: Near Columbus, *Suksdorf;* Klickitat, *Howell* 412, 413; Klickitat Hills, *Gorman*, April, 1895; Simcoe Mountains, *Howell* 180.

Zonal distribution: Arid Transition.

7. **Lomatium cous** (S. Wats.) Coult. & Rose, Contr. Nat. Herb. **7**: 214. 1900.

Cous. Biscuit root.

Peucedanum cous S. Wats. Proc. Am. Acad. **21**: 453. 1886.

Type locality: "John Day's Valley," Oregon. Collected by Howell.

Range: Eastern Oregon and Washington and adjacent Idaho.

Specimens examined: Blue Mountains, *Piper* 2341; Wawawai, *Elmer* 97; above Wawawai, *Piper*, May 6, 1901; Whitman County near Lewiston, *B. Hunter* 45.

Zonal distribution: Arid Transition.

8. **Lomatium circumdatum** (S. Wats.) Coult. & Rose, Contr. Nat. Herb. **7**: 213. 1900.

Peucedanum circumdatum S. Wats. Proc. Am. Acad. **22**: 474. 1887.

Type locality: "On hillsides in the Wallowa region of eastern Oregon." Collected by Cusick.

Range: Eastern Oregon and Washington and adjacent Idaho.

Specimens examined: Blue Mountains, *Horner* 222.

This species is not very satisfactorily distinguished from *L. cous*. Good series of specimens for both of these species are needed before their relations can be made clear.

9. Lomatium suksdorfii (S. Wats.) Coult. & Rose, Contr. Nat. Herb. **7**: 239. 1900.

Peucedanum suksdorfii S. Wats. Proc. Am. Acad. **20**: 369. 1885.

TYPE LOCALITY: "On dry rocky mountain sides, W. Klickitat County, Washington Territory." Collected by Suksdorf.

RANGE: Eastern Washington.

SPECIMENS EXAMINED: West Klickitat County, *Suksdorf* 132; Peshastin, *Sandberg & Leiberg* 489; without locality, *Vasey* 300.

10. Lomatium nudicaule (Pursh) Coult. & Rose, Contr. Nat. Herb. **7**: 238. 1900.

Smyrnium nudicaule Pursh, Fl. **1**: 196. 1814.

Seseli leiocarpum Hook. Fl. Bor. Am. **1**: 263. *pl. 93*. 1834.

Peucedanum leiocarpum Nutt.; Torr. & Gr. Fl. **1**: 626. 1840.

Peucedanum leiocarpum campestre Nutt. loc. cit.

TYPE LOCALITY: "On the Columbia River." Collected by Lewis April 15, 1806, then at the Dalles.

RANGE: From central California to British Columbia and Idaho.

SPECIMENS EXAMINED: Admiralty Head, *O. Piper*, May, 1898; Fairhaven, *Piper* 2805; Lopez Island, *Lyall* in 1858; Tacoma, *Flett* 47; west Klickitat County, *Suksdorf* 130; Mount Stuart, *Brandegee* 797; without locality, *Cooper* in 1854; without locality, *Vasey* 297, 295; Olympic Mountains, *Elmer* 2773.

ZONAL DISTRIBUTION: Transition.

11. Lomatium platyphyllum Coult. & Rose, Contr. Nat. Herb. **7**: 238. 1900.

Peucedanum latifolium Nutt.; Torr. & Gr. Fl. **1**: 625. 1840, not DC. 1830.

Peucedanum nuttallii S. Wats. Bot. King. Explor. 128. 1871, not *Seseli nuttallii* A. Gray. 1870.

TYPE LOCALITY: "Plains east of Wallawallah River, Oregon." Collected by Nuttall.

RANGE: From northern Nevada to eastern Washington and adjacent Idaho.

SPECIMENS EXAMINED: Wenache Mountains, *Elmer* 475; Wenache, *Piper*, March 26, 1895; *Whited* 26, 1021, 1078; Ellensburg, *Whited* 656; Peshastin, *Sandberg & Leiberg*, 487; Wenache Mountains, *Cotton* 1285.

ZONAL DISTRIBUTION: Arid Transition.

12. Lomatium utriculatum (Nutt.) Coult. & Rose, Contr. Nat. Herb. **7**: 215. 1900.

Peucedanum utriculatum Nutt. Torr. & Gr. Fl. **1**: 628. 1840.

TYPE LOCALITY: "Rocky plains, particularly near the confluence of the Wahlamet and Oregon [Columbia] Rivers." Oregon. Collected by Nuttall.

RANGE: From southern California to British Columbia.

SPECIMENS EXAMINED: Admiralty Head, *O. Piper*, April 17, 1898; Whidby Island, *Gardner* 136; Orcas Island and Lopez Island, *Lyall* in 1858; Tacoma, *Flett* 28; Steilacoom Plains, *Piper* 635; Olympic Mountains, *Elmer* 2769; Woodlawn, *Henderson* 395; Vancouver, *Piper* 1931.

ZONAL DISTRIBUTION: Humid Transition.

Not known to occur east of the Cascade Mountains. The Wilkes Expedition specimens (no. 359) undoubtedly belong to this species, but it is more than doubtful that they were collected at old Fort Walla Walla (Wallula).

The specimens referred by Hooker[a] to *Peucedanum foeniculaceum* Nutt. very probably belong to *L. utriculatum*. The Cooper specimens also referred to *P. foeniculaceum*[b] are *P. utriculatum*.

13. Lomatium macrocarpum (Nutt.) Coult. & Rose, Contr. Nat. Herb. **7**: 217. 1900.

Peucedanum macrocarpum Nutt.; Torr. & Gr. Fl. **1**: 627. 1840.

Peucedanum macrocarpum eurycarpum A. Gray, Proc. Am. Acad. **8**: 385. 1872.

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[a] Fl. Bor. Am. **1**: 268. 1834.

[b] Pac. R. Rep. **12**^{2}: 63. 1860.

Peucedanum eurycarpum Coult. & Rose, Rev. N. A. Umb. 61. 1888.

TYPE LOCALITY: "Barren hills on the Oregon" (Columbia). Collected by Nuttall.

RANGE: From central California through eastern Oregon and Washington to British America, eastward to western Colorado and western Wyoming.

SPECIMENS EXAMINED: Wenache, *Whited* 1118, 1202, 1035; Wenache Mountains, *Whited* 1274; Fort Colville, *Lyall* in 1861; Spokane, *Piper*, May 16, 1896; Hangman Creek, *Sandberg & Leiberg* 61; Pullman, *Elmer* 96; *Piper*, June 24, 1894; Garrison, *Piper* 1563; Almota, *Piper*, April 7, 1894; Blue Mountains, *Piper*, July 15, 1896; North Palouse River, *Vasey*, May 6, 1902; Waitsburg, *Horner* 221.

ZONAL DISTRIBUTION: Arid Transition.

13a. Lomatium macrocarpum semivittatum Piper, Bull. Torr. Club **29**: 224. 1902.

TYPE LOCALITY: "Hood River," Oregon. Collected by Henderson.

RANGE: Klickitat County, Washington, and adjacent Oregon.

SPECIMENS EXAMINED: West Klickitat County, *Suksdorf* 279.

This subspecies has been confused with *L. bicolor* (S. Wats.) Coult. & Rose, a species not known to occur in Washington. It has apparently been since redescribed as *Lomatium flavum* Suksdorf.[a]

14. Lomatium artemisiarum Piper.

Lomatium macrocarpum artemisiarum Piper, Bull. Torr. Club **29**: 223. 1902.

TYPE LOCALITY: Pasco, Washington. Collected by Piper.

RANGE: Eastern Washington.

SPECIMENS EXAMINED: Coulee City, *Piper* 3884; Crab Creek, *Sandberg & Leiberg* 243; without locality, *Vasey* 308; North Yakima, *Henderson* 2509, 2511, 2574; Prosser, *Henderson* 2510; Pasco, *Piper* 2976; Hunts Junction, *Leckenby*, April 19, 1898; Coulee City, *Piper* 3884; Prosser, *Cotton* 588; Rattlesnake Mountains, *Cotton* 564; Wallula, *Cotton* 1069.

ZONAL DISTRIBUTION: Upper Sonoran.

15. Lomatium ambiguum (Nutt.) Coult. & Rose Contr. Nat. Herb. **7**: 212. 1900.

Eulophus ambiguus Nutt. Journ. Acad. Phila. **7**: 27. 1854.

Peucedanum ambiguum Nutt.; Torr. & Gr. Fl. **1**: 626. 1840.

TYPE LOCALITY: "Borders of Flat-Head River," Montana. Collected by Wyeth.

RANGE: From eastern Oregon to British Columbia, and eastward to Montana and western Wyoming.

SPECIMENS EXAMINED: Wenache, *Whited*: Clealum, *Whited* 613; Mount Adams, *Henderson*, August, 1892; Badger Mountains, *Whited* 1222; Peshastin, *Sandberg & Leiberg* 481; between Coulee City and Waterville, *Spillman*, May, 1896; Spokane, *Henderson*, July 9, 1892; *Piper* 2299; *Lyall* in 1861; Hangman Creek, *Sandberg & Leiberg* 44, 22; Pullman, *Piper* 1562; *Elmer* 827; Blue Mountains, *Piper* 2337; Spokane County, *Suksdorf* 319; without locality, *Vasey* 298; near Colfax, *Vasey*, May 25, June 26, 1902; Mount Carlton, *Kreager* 1561.

ZONAL DISTRIBUTION: Arid Transition and Upper Sonoran.

16. Lomatium martindalei angustatum Coult. & Rose, Contr. Nat. Herb. **7**: 225. 1900.

Peucedanum martindalei angustatum Coult. & Rose, Bot. Gaz. **13**: 143. 1888.

TYPE LOCALITY: Rocky places "Cascade Mountains," Oregon. Collected by Howell.

RANGE: Mountains of Oregon, Washington, and British Columbia.

SPECIMENS EXAMINED: Mount Baldy, Olympic Mountains, *Lamb* 1325; Olympic Mountains, *Piper*, August, 1895; *Flett*; Mount Rainier, *Piper* 2008; Stampede Tunnel, *Henderson* 2514; Stevens Pass, *Sandberg & Leiberg*, August, 1893, 795; Goat Mountains, *Allen* 258; Mount Adams, *Henderson*, August 9, 1892; *Suksdorf* 383; *Flett* 1299; Skamania County, *Suksdorf* 2112; Olympic Mountains, *Elmer* 2771; without locality, *Vasey* in 1889.

ZONAL DISTRIBUTION: Hudsonian.

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[a] Allg. Bot. Zeitsch. **12**: 6. 1906.

17. **Lomatium hallii** (S. Wats.) Coult. & Rose, Contr. Nat. Herb. 7: 224. 1900.

Peucedanum hallii S. Wats. Proc. Am. Acad. 11: 141. 1876.

Type locality: "Northern Oregon."

Range: Alpine in northern Oregon and Washington.

Specimens collected on Mount St. Helens by Mrs. Briggs in 1885, have been somewhat doubtfully referred to this species. It is otherwise known only from the neighborhood of Mount Hood, Oregon.

18. **Lomatium laevigatum** (Nutt.) Coult. & Rose, Contr. Nat. Herb. 7: 225. 1900.

Peucedanum laevigatum Nutt. in Torr. & Gr. Fl. 1: 627. 1840.

Type locality: "Blue Mountains of Oregon." Collected by Nuttall.

Range: Along the upper Columbia in Oregon and Washington.

Specimens examined: Near Columbus, *Suksdorf* 863.

19. **Lomatium triternatum** (Pursh) Coult. & Rose, Contr. Nat. Herb. 7: 227. 1900.

Seseli triternatum Pursh, Fl. 1: 197. 1814.

Peucedanum triternatum Nutt.; Torr. & Gr. Fl. 1: 626. 1840.

Type locality: "On the waters of Columbia." The type was collected May 6, 1806, by Lewis, on which date the Lewis and Clark Expedition was on the Clearwater River, Idaho, near the mouth of Potlatch River.

Range: From northeastern California to British Columbia.

Specimens examined: Yelm, *Piper* 568; *Smith*, July, 1890; between Olympia and Gate City, *Heller* 4056; Goat Mountains, *Allen* 257; Wenache, *Whited* 1021; Ellensburg, *Whited* 658; North Yakima, *Henderson* 2513; Peshastin, *Sandberg & Leiberg* 596; Fort Colville, *Lyall;* Spokane County, *Suksdorf* 318; Spangle, *Piper*, July 24, 1899; Pullman, *Piper* 1568; *Elmer* 846; Waitsburg, *Horner* 104; Cottonwood Creek, *Vasey*, June 6, 1902; Colville, *Kreager* 603.

Zonal distribution: Upper Sonoran and Transition.

This species varies much in the form of the fruit and in the breadth of the wings. Wide-winged forms have been referred to *L. platycarpum* (*Peucedanum simplex*). If the latter be characterized by having the wings of the fruit broader than the body, our plants would all seem referable to *triternatum*. Wherever the line of division is drawn, the fact remains that a complete series of intergrades exists.

20. **Lomatium robustius** Coult. & Rose, Contr. Nat. Herb. 7: 228. 1900.

Peucedanum triternatum macrocarpum Coult. & Rose. Rev. N. A. Umb. 70. 1888, not *Peucedanum macrocarpum* Nutt. 1840.

Peucedanum triternatum robustius Coult. & Rose, Contr. Nat. Herb. 3: 228. 1895.

Type locality: "Low grounds, W. Klickitat County, Wash." Collected by Suksdorf.

Range: Eastern Washington and eastern Oregon.

Specimens examined: Klickitat County, *Suksdorf* 131: Ellensburg, *Piper* 2742.

21. **Lomatium grayi** Coult. & Rose, Contr. Nat. Herb. 7: 229. 1900.

Peucedanum millefolium S. Wats. in Bot. King Explor. 129. 1871, not Sonder, 1861–62.

Peucedanum grayi Coult. & Rose, Bot. Gaz. 13: 209. 1888.

Type locality: "Antelope Island, (Great) Salt Lake," Utah. Collected by Watson.

Range: From eastern Washington and Oregon to Wyoming and Colorado.

Specimens examined: Wenache, *Whited* 1050: Ellensburg, *Whited* 657; North Yakima, *Henderson*, May 29, 1892; west Klickitat County, *Suksdorf* 280, 24; Morgans Ferry, *Suksdorf* 322, Fort Colville, *Lyall* in 1861; Hangman Creek, *Sandberg & Leiberg* 5; Ritzville, *Sandberg & Leiberg* 180; Pullman, *Elmer* 95; Wawawai, *Piper* 1767; Touchet River, *Horner* 609; Blue Mountains, *Piper* 2339; Dry Creek, *Vasey*, May 5, June 7, 1902; Cape Horn, *Piper* 5012.

Zonal distribution: Arid Transition and Upper Sonoran.

22. **Lomatium brevifolium** Coult. & Rose, Contr. Nat. Herb. 7: 232. 1900.

Peucedanum triternatum brevifolium Coult. & Rose, Rev. N. A. Umb. 70. 1888.

Type locality: "Klickitat County," Washington. Collected by Howell.

Range: Oregon and Washington.

Specimens examined: Columbus, *Suksdorf*, June 10, 1886; Klickitat River, *Suksdorf* 639; *Flett* 1303; Klickitat County, *Howell* 1368; Pasco, *Hindshaw* 15.

Lomatium dasycarpum (Torr. & Gr.) Coult. & Rose (*Peucedanum dasycarpum* Torr. & Gr.) is a Californian species reported from Washington on the basis of specimens collected in Klickitat County by Joseph Howell.[a] The Howell specimens prove to be *L. canbyi* Coult. & Rose.

LEPTOTAENIA.

- Foliage puberulent.
  - Fruit sessile; flowers purple.................................... 1. *L. dissecta.*
  - Fruit pedicelled; flowers yellow................................ 2. *L. multifida.*
- Foliage glabrous.
  - Fruit 10 to 12 mm. broad.. 3. *L. purpurea.*
  - Fruit 4 to 6 mm. broad.
    - Leaflets rigid; flowers purple................................ 4. *L. watsoni.*
    - Leaflets not rigid; flowers yellow, long-pediceled .... 5. *L. salmoniflora.*

1. **Leptotaenia dissecta** Nutt.; Torr. & Gr. Fl. 1: 630. 1840.

Ferula dissecta A. Gray, Proc. Am. Acad. 7: 348. 1868.

Ferula dissoluta S. Wats. in Brewer & Wats. Bot. Cal. 1: 271. 1876.

Type locality: "Plains of the Oregon (Columbia) near the confluence of the Wahlamet." Collected by Nuttall.

Range: From northern California to Vancouver Island.

Specimens examined: Klickitat County, *Howell*, *Suksdorf*; Rattlesnake Mountains, *Cotton* 332; Clallam County, *Elmer* 2764; Wenache, *Whited* 1340 and 1058, 1207, April 9, 1900; *Piper* 2013; Ellensburg, *Whited* 320; Colville, *Lyall* in 1861.

Zonal distribution: Arid Transition.

2. **Leptotaenia multifida** Nutt.; Torr. & Gr. Fl. 1: 630. 1840.

Ferula multifida A. Gray, Proc. Am. Acad. 7: 348. 1868.

Type locality: "Plains of the Oregon [Columbia], east of Wallawallah, and in the Blue Mountains." Collected by Nuttall.

Range: From western Wyoming and Montana to New Mexico and west to Washington and California.

Specimens examined: Blue Mountains, *Piper*, July, 1896; between Coulee City and Waterville, *Spillman*, May, 1896; Medical Lake, *Sandberg & Leiberg* 54; Sprague, *Henderson*, May, 1892; *Sandberg & Leiberg* 212; Pullman, *Elmer* 136; Steptoe, *Vasey*, May 15, 1901; Coulee City, *Piper* 3845; Colville Reservation, *Griffiths & Cotton* 403; Chelan Butte, *Griffiths & Cotton* 185.

Zonal distribution: Arid Transition.

3. **Leptotaenia purpurea** (S. Wats.) Coult. & Rose, Rev. N. A. Umb. 52. 1888.

Ferula purpurea S. Wats. Proc. Am. Acad. 21: 453. 1886.

Type locality: "On rocky hillsides near the lower Columbia River, in Klickitat County, Wash." Collected by Suksdorf.

Range: Klickitat County, Washington, and adjacent Oregon.

Specimens examined: Simcoe Mountains, *Howell* in 1879; west Klickitat County, *Suksdorf* 98, 325, 26, 281.

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[a] Brewer & Wats. Bot. Cal. 2: 452. 1880.

4. **Leptotaenia watsoni** Coult. & Rose, Rev. N. A. Umb. 52. 1888.

TYPE LOCALITY: "In the Wenatchee region," Chelan County, Washington. Collected by Brandegee and by Tweedy.

RANGE: Cascade Mountains about Mount Stuart, Washington.

SPECIMENS EXAMINED: Wenache region, *Brandegee* 801; Mount Stuart, *Sandberg & Leiberg* 808; *Elmer* 1171.

5. **Leptotaenia salmoniflora** Coult. & Rose, Contr. Nat. Herb. **7**: 201. 1900.

Peucedanum salmoniflora Coult. & Rose, Contr. Nat. Herb. **3**: 228. 1895.

TYPE LOCALITY: "On basaltic rocks, near upper ferry, Clearwater River, above Lewiston," Nez Perces County, Idaho. Collected by Sandberg, MacDougal, & Heller.

RANGE: Bluffs of the Snake River, Washington, and of the Clearwater River, Idaho.

SPECIMENS EXAMINED: Almota, *Piper* 2781; Wawawai, *Piper* 2782; *Elmer* 92.

ZONAL DISTRIBUTION: Upper Sonoran.

CARUM.

1. **Carum gairdneri** (Hook. & Arn.) A. Gray, Proc. Am. Acad. **7**: 344. 1867.

Atenia gairdneri Hook. & Arn. Bot. Beech. Voy. 349. 1839–40.

Edosmia gairdneri Nutt.; Torr. & Gr. Fl. **1**: 612. 1840.

TYPE LOCALITY: Near San Francisco or Monterey, California. Collected by Douglas.

RANGE: From British Columbia to southern California, eastward to the Black Hills of South Dakota, and to Colorado and Arizona.

SPECIMENS EXAMINED: North Yakima, *Watt*, August, 1895; Falcon Valley, *Suksdorf* 635; Cascade Mountains, latitude 49°, *Lyall*; Leavenworth, *Whited*, August 6, 1896; Coulee City, *Henderson*, July 11, 1892; White Bluff Ferry, *Lake & Hull*, August 1, 1892; Fort Colville, *Lyall;* Mason County, *Piper* 1051; Spokane, *Piper*, July, 1896; Pullman, *Hull* 537; Almota, *Piper* 1935; without locality, *Vasey* 307; Alkali Lake, *Sandberg & Leiberg* 414; Steptoe, *Vasey*, August 10, 1902; Clarks Springs, Spokane County, *Kreager* 575; Rattlesnake Mountains, *Cotton* 661.

ZONAL DISTRIBUTION: Transition.

The roots of this plant have a sweet nutty flavor and were formerly much used for food by the Indians. Forms of this species from Washington have been mistaken for *Carum kelloggii*, *Carum oreganum*, and *Eulophus bolanderi*.

CICUTA. WATER HEMLOCK.

Fruit oblong .... 3. *C. occidentalis*.
Fruit orbicular.
  Leaflets thickish, lanceolate to ovate-lanceolate, closely and sharply serrate or even cleft, strongly reticulate beneath .... 1. *C. douglasii*.
  Leaflets thinner, linear-lanceolate, not so closely or sharply serrate, not strongly reticulate beneath .... 2. *C. vagans*.

1. **Cicuta douglasii** (DC.) Coult. & Rose, Contr. Nat. Herb. **7**: 95. 1900.

?Sium ?douglasii DC. Prod. **4**: 125. 1830.

Cicuta purpurata Greene, Pittonia, **2**: 8. 1889.

TYPE LOCALITY: "In America boreali occid." Collected by Douglas.

RANGE: In marshes from Oregon to Alaska.

SPECIMENS EXAMINED: Straits of De Fuca, *Scouler;* Yakima County, *Henderson*, July, August, 1892; confluence of Columbia, *Douglas;* Clealum, *Greene*, August 14, 1889.

ZONAL DISTRIBUTION: Transition.

2. **Cicuta vagans** Greene, Pittonia **2**: 9. 1889.

TYPE LOCALITY: In an estuary of Lake Pend Oreille, Idaho. Collected by Greene.

RANGE: In wet places and marshes, from northeastern California to Idaho, British Columbia, and Vancouver Island.

Specimens examined: Montesano, *Heller* 4069; Sumas, *Henderson* 373; Olympia, *Henderson* 373; Nisqually Valley, *Allen* 255; Falcon Valley, *Suksdorf*, July, September, 1883; Kitsap County, *Piper* 640; Puyallup Reservation, *Brodie*, September, 1900; Chambers Lake, *Henderson*, August 23, 1892; Samish Lake, *Suksdorf* 1192; Cottonwood Creek, *Vasey*, September 18, 1901; Waitsburg, *Horner* 620, 574; Clallam County, *Elmer* 2761.

Zonal distribution: Transition.

The characters used to differentiate this from the preceding are admittedly not very satisfactory. Good series of specimens may demonstrate them to be illusive.

3. **Cicuta occidentalis** Greene, Pittonia **2**: 7. 1889.

Type locality: Trinidad, Colo., "near the New Mexican line."

Range: In the Rocky Mountain region, from the Black Hills of South Dakota to Washington, and southward through Colorado and northern Nevada to New Mexico.

Specimens examined: Spokane, *Piper* 3516; Pullman, *Piper*, August 23, 1897, 3512; Spokane, *Kreager* 555; Meyer's Falls, *Kreager* 503.

Zonal distribution: Arid Transition.

The three foregoing species appear in Suksdorf's list under the names *C. virosa* L., *C. maculata* L., and *C. californica* A. Gray, for which they were formerly mistaken.

ZIZIA.

1. **Zizia cordata** (Walt.) Koch; DC. Prod. **4**: 100. 1830.

Smyrnium cordatum Walt. Fl. Car. 114. 1788.

Thaspium trifoliatum apterum A. Gray, Man. ed. 2. 156. 1856.

Type locality: None mentioned, but Carolina by implication.

Range: From eastern Canada to North Carolina and Alabama and extending westward to Assiniboia, Alberta, Washington, and Colorado.

Specimens examined: Crab Creek, *Suksdorf* 316; Wilbur, *Henderson* 2516; Hangman Creek, *Sandberg & Leiberg* 46; Pullman, *Elmer* 890; *Piper* 1557; *Lake & Hull* 534.

Zonal distribution: Arid Transition.

LEIBERGIA.

1. **Leibergia orogenioides** Coult. & Rose, Contr. Nat. Herb. **3**: 575. *pl. 27.* 1896.

Type locality: "Santianne Creek bottoms, Coeur d'Alene Mountains, Idaho, altitude 950 meters." Collected by Leiberg.

Range: Wet ground, along streams, Idaho and Washington.

Specimens examined: Spokane County, *Suksdorf* (the distributed specimens cultivated at Bingen, no. 1211).

Zonal distribution: Arid Transition.

A related and undescribed species is represented by imperfect specimens collected by Suksdorf between Cottonwood and Cheney (no. 314, June 14, 1884).

OENANTHE.

1. **Oenanthe sarmentosa** Presl.; DC. Prod. **4**: 138. 1830. Water parsley.

Type locality: "Nootka Sound," Vancouver Island. Collected by Haenke.

Range: From British Columbia to central California.

Specimens examined: Olympic Mountains, *J. M. Grant* in 1889; Montesano, *Heller* 3985; Seattle, *Piper* 632; Tacoma, *Flett* 147; Sumas, *Lyall*; Port Ludlow, *Binns*, July 25, 1890; upper Nisqually Valley, *Allen* 35; Wind River, *Flett* 1300; west Klickitat County, *Suksdorf* 57; Skokomish Valley, *Kincaid*, June 1892; without locality, *Vasey* 303; Gray's Harbor, *Wilkes Expedition*; Olympic Mountains, *Elmer* 2762.

Zonal distribution: Humid Transition.

Oenanthe californica S. Wats. has been reported from Washington and it is listed by Suksdorf, but it is quite certain that it does not occur so far north.

LILAEOPSIS.

1. **Lilaeopsis occidentalis** Coult. & Rose, Bot. Gaz. **24:** 48. 1897.

TYPE LOCALITY: "Wet places on coast of Yaquina Bay, Oregon." Collected by Hall.

RANGE: Coast region from Oregon to British Columbia and southern Alaska.

SPECIMENS EXAMINED: Seattle, *Piper* 2759; *Smith* 642; Whidby Island, *Gardner* 129; Lake Washington, *Suksdorf* 972; Oyhut, *Lamb* 1272; Fidalgo City, *Flett* 2113; Clallam County, *Elmer* 2767; Shoalwater Bay, *Henderson*.

ZONAL DISTRIBUTION: Humid Transition.

This species was formerly considered the same as the Atlantic coast plant *L. lineata* (Michx.) Greene (*Crantzia lineata* Nutt.).

BERULA.

1. **Berula erecta** (Huds.) Coville, Contr. Nat. Herb. **4:** 115. 1893.

Sium erectum Huds. Fl. Angl. 103. 1762.

Sium angustifolium L. Sp. Pl. ed. 2. **2:** 1672. 1763.

Berula angustifolia Mert. & Koch in Röhling, Deutschl. Fl. ed. 3. **2:** 433. 1826.

TYPE LOCALITY: Not given, but presumably England.

RANGE: In swamps and streams, Ontario to Texas, westward to British Columbia and California, and extending into Mexico.

SPECIMENS EXAMINED: Near Tacoma, *Flett* 221, September, 1896; Wilbur, *Henderson*; Spokane, *Piper* 2850; *Elmer*, September, 1897; Valley, *Beattie & Chapman* 2163.

ZONAL DISTRIBUTION: Transition.

LIGUSTICUM.

Stems naked, the leaves mostly basal; flowers purplish.................. 4. *L. purpureum*
Stems leafy; flowers white.
  Fruit merely ribbed, not winged.................................. 1. *L. apiifolium*.
  Fruit winged.
    Inflorescence glabrous; leaflets confluent...................... 2. *L. canbyi*.
    Inflorescence puberulent; leaflets distinct..................... 3. *L. leibergi*.

1. **Ligusticum apiifolium** (Nutt.) A. Gray, Proc. Am. Acad. **7:** 347. 1868.

Cynapium apiifolium Nutt.; Torr. Gr. Fl. **1:** 641. 1840.

TYPE LOCALITY: "Plains of Oregon, near the confluence of the Wahlamet." Collected by Nuttall.

RANGE: Oregon and Washington west of the Cascade Mountains.

SPECIMENS EXAMINED: Montesano, *Heller* 3973; Chehalis County, *Lamb* 1756; Olympia, *Kincaid*, July 4, 1896; Manor, *Piper*, July 14, 1899; Columbia River, *Nuttall;* Cape Horn, *Piper* 1914.

ZONAL DISTRIBUTION: Humid Transition.

2. **Ligusticum canbyi** Coult. & Rose, Rev. N. A. Umb. 86. 1888.

TYPE LOCALITY: "Low grounds near head waters of Jocko River, Montana." Collected by Canby.

RANGE: In the mountains of northwestern Montana, northern Idaho, eastern Washington, and adjacent British Columbia.

SPECIMENS EXAMINED: Skagit Pass, [illegible], August 24, 1892.

3. **Ligusticum leibergi** Coult. & Rose, Contr. Nat. Herb. **7:** 134. 1900.

TYPE LOCALITY: "[illegible] River Basin, Kootenai County, Idaho." Collected by Leiberg.

RANGE: Idaho and eastern Washington.

SPECIMENS EXAMINED: Blue Mountains, *Piper* 2427; *Horner* 308; Latah Creek, *Suksdorf* [illegible]

ZONAL DISTRIBUTION: Canadian.

LIGUSTICUM TENUIFOLIUM S. Wats. was included in Suksdorf's list on the basis of the Suksdorf specimen above cited.

4. Ligusticum purpureum Coult. & Rose, Contr. Nat. Herb. 7: 137. 1900.

TYPE LOCALITY: "Goat Mountains, Washington." Collected by Allen.

RANGE: Cascade Mountains of Washington.

SPECIMENS EXAMINED: Mount Rainier, *Piper* 2009, August, 1895; *Allen* 259; near Mount Adams, *Henderson*, August, 1892; Horseshoe Basin, *Elmer* 706; Mount Adams, *Suksdorf* 581.

ZONAL DISTRIBUTION: Hudsonian.

Related to the above species, but apparently distinct, are the following specimens: Mount Rainier, *Piper* 629; Stevens Pass, *Sandberg & Leiberg* 731; *Whited* 1464; Wenache Mountains, *Cotton* 1685; Cascade Mountains, *Tweedy* 288. Better material is needed to clear up the matter.

LIGUSTICUM SCOTHICUM L. Sp. Pl. 1: 250. 1753. Type locality, "Ad litora Maris in Anglia, Suecia." Range, salt marshes along the east coast from Labrador (and up the St. Lawrence) to Connecticut; along the entire Alaskan coast; also coasts of northern Asia and Europe. "Mouth of the Columbia," according to Hooker, basing on Douglas.[a] "Not rare along coast at Shoalwater Bay," according to A. Gray, basing on Cooper.[b] The species is common on the Alaskan coast, but there are no specimens preserved in American herbaria to show that it occurs on the Washington coast.

GLEHNIA.

1. Glehnia littoralis (A. Gray) Schmidt, Mem. Acad. Petrop. VII. **12**^{2}: 138. 1868, as syn.; Coult. & Rose, Contr. Nat. Herb. 7: 165. 1900.

Cymopterus littoralis A. Gray, Pac. R. Rep. **12**^{2}: 62. 1860.

Phellopterus littoralis Schmidt, Mem. Acad. Petrop. VII. **12**^{2} : 138. 1868.

TYPE LOCALITY: "On the sands of the seashore at Shoalwater Bay," Washington. Collected by Cooper.

RANGE: Sandy seashores from Oregon to Alaska; also in Korea and Japan.

SPECIMENS EXAMINED: Oyhut, *Lamb* 1249; Shoalwater Bay, *Cooper*; Whidby Island, *Gardner* 138; Clallam County, *Elmer* 2768; Ilwaco, *Piper* 5002.

ZONAL DISTRIBUTION: Humid Transition.

PTERYXIA.

Leaves with pale rigid segments.................................... 1. *P. terebinthina*.
Leaves greener with segments not rigid............................ 2. *P. foeniculacea*.

1. Pteryxia terebinthina (Hook.) Coult. & Rose, Contr. Nat. Herb. 7: 171. 1900.

Selinum terebinthinum Hook. Fl. Bor. Am. 1: 266. *pl. 95.* 1834.

Cymopterus terebinthinus Torr. & Gr. Fl. 1: 624. 1840.

Pteryxia terebinthacea Nutt.; Torr. & Gr. Fl. 1: 624. 1840, as synonym.

TYPE LOCALITY: "Sandy grounds of the Wallawallah River, North-West coast of America." Collected by Douglas.

RANGE: Dry ground, eastern Oregon and eastern Washington.

SPECIMENS EXAMINED: Cascade Mountains to Fort Colville, *Lyall* in 1860; Falcon Valley. *Suksdorf* 129; Morgans Ferry, *Suksdorf* 317; Atanum River, *Flett* 1295; Pasco, *Hindshaw*, May, 1896; *Piper* 2980; *Henderson*, May, 1892; Hunts Junction, *Leckenby*, April, 1898; Walla Walla region, *Brandegee* 803; junction Crab and Wilson creeks, *Sandberg & Leiberg* 230; Moxee to North Yakima, *Griffiths & Cotton* 39; Prosser, *Cotton* 1080; Rock Creek, *Cotton* 957.

ZONAL DISTRIBUTION: Upper Sonoran.

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[a] Fl. Bor. Am. 1: 265. 1834.

[b] Pac. R. R. Rep. **12**^{2}: 62. 1860.

2. **Pteryxia foeniculacea** (Torr. & Gr.) Nutt.; Coult. & Rose, Contr. Nat. Herb. **7**: 171. 1900.

Cymopterus foeniculaceus Torr. & Gr. Fl. **1**: 624. 1840.

Type locality: "On rocks, Blue Mountains of Oregon." Collected by Nuttall.

Range: Eastern Oregon, eastern Washington, and adjacent Idaho.

Specimens examined: Blue Mountains, *Horner* 305; *Piper* 2340; Tukanon River, *Lake & Hull* 535; Almota, *Piper* 2795; Wawawai, *Elmer* 770; without locality, *Vasey* 309?; Clarks Springs, Spokane County, *Kreager* 119.

Zonal distribution: Arid Transition and Upper Sonoran.

HESPEROGENIA.

1. **Hesperogenia stricklandi** Coult. & Rose, Contr. Nat. Herb. **5**: 203. 1899.

Type locality: "Mount Rainier, Washington." Collected by Allen.

Range: Mount Rainier, Washington.

Specimens examined: Mount Rainier, *Allen* 278; *Flett*, August, 1897; *Strickland* in 1896.

Zonal distribution: Hudsonian.

OROGENIA.

1. **Orogenia linearifolia** S. Wats. Bot. King. Explor. 120. *pl. 14. figs. 1 to 3.* 1871.

Type locality: "Damp shaded ridge of the Wahsatch, north of Parley's Park, 7,500 feet altitude," Utah. Collected by Watson.

Range: From Washington and Idaho to Oregon, Utah, and southwestern Colorado.

Specimens examined: Falcon Valley, *Suksdorf* in 1882; east of the Cascade Mountains, *Wilkes Expedition.*

SIUM.

1. **Sium cicutaefolium** Schrank, Baier. Fl. **1**: 558. 1798.

Sium lineare Michx. Fl. **1**: 167. 1803.

Sium pusillum Nutt.; Torr. & Gr. Fl. **1**: 611. 1840.

Type locality: Not determined.

Range: In swamps from Newfoundland to Virginia, west to British Columbia and northern California. Europe. Asia.

Specimens examined: Sumas, *Lyall* in 1858-59, Seattle, *Piper*, September, 1892; Tacoma, *Flett* 144, 220; Lindsley's ranch, Clarke County, *Henderson* 375, Trout Lake, *Suksdorf* 185; Spokane County, *Suksdorf* 922; North Palouse River, *Vasey*, July 17, 1901; Pullman, *Piper*; Rock Lake, *Lake & Hull* 536; Toppenish, *Cotton* 768.

Zonal distribution: Transition.

COELOPLEURUM.

Leaflets obtuse, very thick .... 1. *C. maritimum.*
Leaflets acute or acuminate, thinner .... 2. *C. longipes.*

1. **Coelopleurum maritimum** Coult. & Rose, Bot. Gaz. **13**: 145. 1888.

Type locality: "Wet ocean bluffs, Long Beach, Ilwaco (Pacific County), Wash." Collected by Henderson.

Range: Ocean bluffs near the mouth of the Columbia River.

Specimens examined: Ilwaco, *Henderson*, September, 1892; *Piper* 4995.

Zonal distribution: Humid Transition.

2. **Coelopleurum longipes** Coult. & Rose, Contr. Nat. Herb. **7**: 142. 1900.

Type locality: "Tide marshes near Astoria, Oregon." Collected by Howell.

Range: Seacoast swamps, from the Columbia River to southern Alaska.

Specimens examined: Seattle, *Piper* 567; Tacoma, *Piper*; Union City, *Piper* in 1890; Fairhaven, *Suksdorf* 1200; Hoodsport, *Henderson*, August 15, 1890.

Zonal distribution: Humid Transition.

Formerly confused with the more northern, larger-fruited *C. gmelini* (DC.) Ledeb.

HYDROCOTYLE.

1. **Hydrocotyle ranunculoides** L. f. Suppl. 177. 1781.

TYPE LOCALITY: "Mexico."

RANGE: Eastern Pennsylvania to Florida, thence westward to Texas, California, and Washington.

SPECIMENS EXAMINED: Seattle, *Piper* 639; Tacoma, *Flett* 225; O'Briens, King County, *Piper*.

ZONAL DISTRIBUTION: Humid Transition.

CORNACEAE. DOGWOOD FAMILY.

Flowers perfect in cymes, either loose or head-like .... CORNUS.
Flowers dioecious, in spikes .... GARRYA.

CORNUS.

Flowers in loose cymes, not involucrate; fruit white or blue.
  Cyme branches hairy; leaves loosely pubescent beneath .... 1. *C. occidentalis.*
  Cyme branches glabrous; leaves appressed-pubescent beneath..... 2. *C. stolonifera.*
Flowers in head-like cymes, surrounded by a conspicuous involucre; fruit red.
  Tree, 10 to 20 m. high; bracts 4 to 8 cm. long.................... 3. *C. nuttallii.*
  Herbaceous, 8 to 20 cm. high; bracts 1 to 2 cm. long.............. 4. *C. canadensis.*

1. **Cornus occidentalis** (Torr. & Gr.) Coville, Contr. Nat. Herb. **4**: 117. 1893.

Cornus pubescens Nutt. Sylva. **3**: 54. 1849.

Cornus sericea ? occidentalis Torr. & Gr. Fl. 1: 652. 1840.

TYPE LOCALITY: "N. W. coast, *Douglas, Mr. Tolmie! Dr. Scouler!*"

RANGE: British Columbia to north California, east to Idaho.

SPECIMENS EXAMINED: Montesano, *Heller* 3857; Whidby Island, *Gardner* 139; Seattle, *Piper* 262, July 10, 1895, July 4, 1897; Silverton, *Bouck* 91; Cascade Mountains, latitude 49°, *Lyall* in 1859; Spokane, *Piper* 2692; Clarks Springs, *Kreager* 50, 571; Clallam County, *Elmer* 2699; Valley, *Beattie & Chapman* 2156.

ZONAL DISTRIBUTION: Transition.

CORNUS DRUMMONDII Meyer, as recorded in Cooper's Report, is doubtless the above species.

2. **Cornus stolonifera** Michx. Fl. 1: 92. 1803. RED OSIER.

TYPE LOCALITY: "Hab. ad ripas amniumque rivorumque Canadae et Novae Angliae."

RANGE: New Brunswick to Alaska, south to Virginia, and in the mountains to California and New Mexico.

SPECIMENS EXAMINED: Wenache, *Whited* 205, 1135; Ellensburg, *Piper*, May 20, 1897; Tampico, *Henderson*, July 31, 1892; Mabton, *Cotton* 368; west Klickitat County, *Suksdorf*; Coulee City, *Lake & Hull*, August 8, 1892; New London, *Lamb* 1169; Sprague, *Sandberg & Leiberg* 151; Spokane, *Henderson*, June 12, 1892; Lake Chelan, *Lake & Hull*, August 25, 1892; Walla Walla, *Mrs. L. P. Anderson;* Pullman, *Elmer* 840; *Piper* 2648; Wawawai, *Piper*, June 9, 1894; *Lake & Hull* 440; Blue Mountains, *Piper*, August 2, 1896; *Piper*, July 15, 1896; without locality, *Vasey* in 1889.

ZONAL DISTRIBUTION: Arid Transition and Upper Sonoran.

CORNUS BAILEYI Coult. & Evans has twice been reported from Washington. In each case the specimens are, in our opinion, really *C. stolonifera*.

3. **Cornus nuttallii** Audubon; Torr. & Gr. Fl. 1: 652. 1840. DOGWOOD.

TYPE LOCALITY: Oregon.

RANGE: British Columbia to California, west of the Cascade Mountains, and in north Idaho.

Specimens examined: Sumas Prairie, *Lyall* in 1858–59; Seattle, *Piper* 113; upper Valley Nisqually, *Allen* 208; Railroad Creek, *Elmer* in 1897; without locality, *Vasey* in 1889; Clallam County, *Elmer* 2698; Stehekin, *Griffiths & Cotton* 225.

Zonal distribution: Humid Transition.

This species very commonly blossoms a second time in the fall, when the fruit from the spring flowers is ripe. These fall flowers are often pink-tinged.

4. **Cornus canadensis** L. Sp. Pl. **1**: 118. 1753.

Type locality: "In Canada."

Range: Alaska to Newfoundland, southward to California, Colorado, Minnesota, and New Jersey.

Specimens examined: Ilwaco, *Henderson*, September 9, 1892; Silverton, *Bouck* 89; Mount Rainier, *Flett* 293; *Piper;* Stevens Pass, *Sandberg & Leiberg* 776; Cascade Mountains, latitude 49°, *Lyall;* "Columbia River, frequent," *Douglas;* Entiat Creek, *Mrs. Howe;* Big Meadows, *Kreager* 423; Lake Kalispel, *Kreager*, July 3, 1902; without locality, *Vasey* in 1889; Ilwaco, *Piper* 4950.

Zonal distribution: Canadian.

Cornus suecica var. β Hook. Fl. Bor. Am. **1**: 277. "Fort Vancouver on the Columbia. Dr. Scouler." The above reference is all the evidence we have of the occurrence of this species in Washington. It is probable that the specimen is merely a form of *C. canadensis* L.

GARRYA.

1. **Garrya fremontii** Torr. Pac. R. Rep. **4**: 136. 1857.

Type locality: "On the Upper Sacramento, above the Great Canon." Collected by Fremont.

Range: Middle California to Washington.

Specimens examined: Wind River, *Flett* 1211.

Garrya elliptica Douglas is included by Suksdorf in his list, but there are no specimens to substantiate its occurrence in Washington.

PYROLACEAE. Pyrola Family.

Flowers solitary; style long .... Moneses.
Flowers not solitary.
  Inflorescence a corymb; style short .... Chimaphila.
  Inflorescence a raceme; styles mostly long .... Pyrola.

MONESES.

1. **Moneses uniflora** (L.) A. Gray, Man. ed. **1**: 273. 1848.

Pyrola uniflora L. Sp. Pl. **1**: 397. 1753.

Moneses grandiflora S. F. Gray, Nat. Arr. Brit. Pl. **2**: 403. 1821.

Moneses reticulata Nutt. Trans. Am. Phil. Soc. **8**: 271. 1843.

Type locality: "Habitat in Europae borealis sylvis."

Range: Alaska to Labrador, southward to Pennsylvania, Colorado, and Oregon.

Specimens examined: Humptulips, *Lamb* 1084a; upper Nisqually Valley, *Allen* 67; Silverton, *Bouck* 127; mountains north of Ellensburg, *Brandegee* 949; Skamania County, *Suksdorf* 2243; Green River Hot Springs, *Piper* in 1888; Big Meadows, *Kreager* 413; Ilwaco, *Piper* 5023.

Zonal distribution: Canadian.

CHIMAPHILA.

Flowers many; leaves cuneate-oblanceolate, numerous .... 1. *C. umbellata*.
Flowers few; leaves ovate or oblong-lanceolate, few .... 2. *C. menziesii*.

1. **Chimaphila umbellata** (L.) Nutt. Gen. 1: 274. 1818.
Pyrola umbellata L. Sp. Pl. 1: 396. 1753.
Chimaphila corymbosa Pursh, Fl. 1: 300. 1814.

Type locality: "Habitat in Europae, Asiae and Americae septentrionalis sylvis."

Range: British Columbia to Canada, southward to Mexico and Georgia. Europe. Asia.

Specimens examined: Mount Constitution, *Henderson*, July 4, 1892; near Skagit Pass, *Lake & Hull* 564; Fort Vancouver; Wenache Valley, *Sandberg & Leiberg* 565; head of Twisp River, *Whited* 189; without locality, *Vasey* 372; Olympic Mountains, *Elmer* 2471; Davis ranch, *Kreager* 179.

Zonal distribution: Transition and Canadian.

2. **Chimaphila menziesii** (R. Br.) Spreng. Syst. 2: 317. 1825.
Pyrola menziesii R. Br.; D. Don, Mem. Wern. Soc. 5: 245. 1824.

Type locality: "Habitat in Americae ora boreali-occidentali."

Range: British Columbia to California and Idaho.

Specimens examined: Cascade Mountains, latitude 49°, *Lyall*; upper Nisqually Valley, *Allen* 103; Mount Rainier, *Piper*, August, 1895; Mount Adams, *Flett* 1215; Mount Stuart, *Sandberg & Leiberg* 569; Falcon Valley, *Suksdorf* 39; Stampede Tunnel, *Henderson*, October 5, 1892; Blue Mountains, *Lake & Hull*, July 4, 1892; Mount Carlton, *Kreager* 284.

Zonal distribution: Canadian.

PYROLA.

Style straight.
Leaves orbicular; style very short .... 1. *P. minor*.
Leaves ovate; style long .... 2. *P. secunda*.
Style curved downward.
Green leaves none, or very rudimentary.
Flowers red .... 3. *P. aphylla*.
Flowers white .... 5a. *P. picta integra*.
Green leaves present.
Calyx lobes obtuse, very short; flowers greenish .... 4. *P. chlorantha*.
Calyx lobes acute.
Flowers white or whitish.
Veins of leaves white-bordered .... 5. *P. picta*.
Veins of leaves not white-bordered.
Leaves spatulate-oblong, not glaucous .... 5a. *P. picta dentata*.
Leaves ovate, glaucous .... 5b. *P. picta integra*.
Flowers red or pink.
Leaves coriaceous, shiny, acute .... 6. *P. bracteata*.
Leaves thin, dull, obtuse .... 7. *P. incarnata*.

1. **Pyrola minor** L. Sp. Pl. 1: 396. 1753.

Type locality: "Habitat in Europa frigidiore."

Range: Alaska to Greenland, southward to Oregon, New Mexico, and New England. Europe. Asia.

Specimens examined: Cascade Mountains, *Suksdorf* 2036; Wenache Region, *Brandegee* 948½; Stevens Pass, *Sandberg & Leiberg* 715; Klickitat County, *Suksdorf*, July, 1886; Fort Vancouver, *Garry;* Davis ranch, *Kreager* 208.

Zonal distribution: Canadian.

2. **Pyrola secunda** L. Sp. Pl. 1: 396. 1753.

Type locality: "Habitat in Europae borealis sylvis."

Range: Alaska to Labrador, southward to Virginia, Michigan, New Mexico, and California. Europe. Asia.

Specimens examined: Cascade Mountains, latitude 49°, *Lyall* in 1859; Mount Rainier, *Piper* 2046; Lake Wenache, *Sandberg & Leiberg* 637; Stampede Pass, *Henderson*, July 26, 1892; Vancouver, May, 1826; Horseshoe Basin, *Elmer* 727; Cascade Mountains to Colville, latitude 49°, *Lyall* in 1860; Blue Mountains, *Piper*, July, 1896; without locality, *Vasey* 369; Clallam County, *Elmer* 2468; Davis ranch, *Kreager* 180; Big Meadows, Stevens County, *Kreager*, August 5, 1902; Kalispel Valley, *Kreager* in 1902.

Zonal distribution: Canadian.

3. Pyrola aphylla Smith, Rees' Cycl. **29**: n. 7. 1814.

Pyrola aphylla paucifolia Howell, Fl. N. W. Am. 425. 1901.

Type locality: "Gathered on the west coast of North America." Collected by Menzies, at Nootka Sound according to Don.

Range: British Columbia to Idaho and California.

Specimens examined: Whidby Island, *Gardner* 190; Seattle, *Piper* 142; Tacoma, *Flett* 115; west Klickitat County, *Suksdorf* in 1886; Nason Creek, *Sandberg & Leiberg* 622; Blue Mountains, *Piper*, August 2, 1892; without locality, *Vasey* 371; Kalispel Lake, *Kreager* 341.

Zonal distribution: Transition and Canadian.

4. Pyrola chlorantha Sw. Vet. Acad. Handl. Stockh. **1810**: 190. *pl. 5.* 1810.

Type locality: Carlsberg, near Stockholm, Sweden.

Range: British Columbia to Labrador, southward to Oregon, Colorado, Nebraska, and Virginia.

Specimens examined: Island County, *Henderson* 2416; Whidby Island, *Gardner* 191; Nisqually Valley, *Allen*, July 21, 1894; Wenache Region, *Brandegee* 948; Klickitat River, *Suksdorf* 158; Mount Adams, *Flett* 1212; Falcon Valley, *Suksdorf* 542; Blue Mountains, *Lake & Hull* 769; without locality, *Vasey* 367; Davis ranch, Spokane County, *Kreager* 207.

Zonal distribution: Canadian and Transition.

5. Pyrola picta Smith, Rees' Cycl **29**: n. 8. 1814.

Type locality. "Found on the west coast of North America." Collected by Menzies, whose specimens, Hooker states, are from Nootka Sound.

Range: Vancouver Island to California, Wyoming, and Utah.

Specimens examined: Cascade Mountains, *Suksdorf* 2036; Mount Adams, *Flett* 1216; Baldy Peak, *Lamb* 1293; Peshastin, *Sandberg & Leiberg*, August, 1893; Nason Creek, *Sandberg & Leiberg* 620; Blue Mountains, *Piper*, August 2, 1896; without locality, *Vasey* 370; Seattle, *Piper* in 1888.

Zonal distribution: Transition.

5a. Pyrola picta dentata (Smith).

Pyrola dentata Smith, Rees' Cycl. **29**: n. 6. 1814.

Type locality: "Gathered by Mr. Menzies on the west coast of North America," at Nootka, according to Don.

Range:

Specimens examined: Near Union City, *Piper* 935; Mount Elinor, Mason County, *Jennie V. Getty* in 1902; Clallam County, *Elmer*; Mount Storm King, *Lawrence* 336.

Zonal distribution: Humid Transition.

5b. Pyrola picta integra (A. Gray).

Pyrola dentata integra A. Gray; Cooper, Pac. R. Rep. **12**^{2}: 54. 1860.

Pyrola pallida Greene, Pittonia **4**: 39. 1899.

Pyrola sparsifolia Suksdorf. Allg. Bot. Zeitschr. **12**: 26. 1906.

Type locality: "On high wooded hills, east of Mount Adams."

Range: Washington to southern California.

Specimens examined: Simcoe Mountains, *Howell* 332; Mount Adams, *Suksdorf* 440; Cascade Mountains, *Cooper* in 1853; Valley, *Beattie & Chapman* 2277.

Zonal distribution: Canadian.

6. **Pyrola bracteata** Hook. Fl. Bor. Am. **2**: 47. 1834.

Pyrola rotundifolia bracteata A. Gray in Brewer & Wats. Bot. Cal. **1**: 460. 1876.

Type locality: "N. W. Coast." Collected by Scouler.

Range: British Columbia to Idaho and California.

Specimens examined: Mount Constitution, *Henderson*, July 4, 1892; Skokomish River, *Henderson*, June 15, 1892; Nisqually Valley, *Allen* 68; Mount Rainier, *Piper* 2048; Mount Adams, *Flett* 1213; Falcon Valley, *Suksdorf* 1546 in part; Fish Lake, Chelan County, *A. D. Dunn*, August 8, 1900; Klickitat River, *Henderson*, August 4, 1892; Big Meadows, Stevens County, *Kreager*, August 5, 1902; Blue Mountains, *Piper*, July 15, 1896; Clallam County, *Elmer* 2465.

Zonal distribution: Transition.

7. **Pyrola incarnata** (DC.) Fisch.; DC. Prod. **7**: 773. 1839, as synonym.

Pyrola rotundifolia incarnata DC. Prod. **7**: 773. 1839.

Pyrola elata Nutt. Trans. Am. Phil. Soc. **8**: 270. 1843.

Type locality: "In Dahuria."

Range: Alaska to New England and Oregon. Asia.

Specimens examined: Seattle, *Piper* 2760; San Juan Island, *Lyall* in 1858; Cascade Mountains, latitude 49°, *Lyall* in 1859–60; Nason Creek, *Sandberg & Leiberg* 614; Railroad Creek, *Elmer*, September, 1897; Twisp River, *Whited* 219; Skagit Pass, *Lake & Hull*, August 25, 1892; Falcon Valley, *Suksdorf* 1546 in part; Blue Mountains, *Lake & Hull* 565; Yakima County, *Mrs. Steinweg* in 1894; Big Meadow, Stevens County, *Kreager*, August 6, 1902; Davis ranch, *Kreager* 182.

Zonal distribution: Transition.

One of Lyall's specimens, which has been considered to be *P. elliptica* Nutt., is probably a form of *P. incarnata*. We have seen no satisfactory evidence that *P. elliptica* occurs west of the Rocky Mountains.

MONOTROPACEAE. Indian Pipe Family.

Ovary 4 or 5-celled.
  Corolla wanting; flowers spicate .... Allotropa.
  Corolla present; flowers solitary or racemose.
    Flowers solitary .... Monotropa.
    Flowers racemose.
      Corolla polypetalous, deciduous .... Hypopitys.
      Corolla gamopetalous, persistent .... Pterospora.
Ovary 1-celled.
  Calyx of 4 or 5 lacerate sepals; petals similar .... Pleuricospora.
  Calyx of 2 entire sepals; corolla tubular .... Hemitomes.

ALLOTROPA.

1. **Allotropa virgata** Torr. & Gr. Pac. R. Rep. **6**^{3}: 80, 81. 1857.

Type locality: "Cascade Mountains of northern Oregon." Collected by Pickering.

Range: Washington to California from the Cascades and Sierras to the coast.

Specimens examined: Seattle, *Piper* 478; Lake Keechelus, *Henderson*, July 27, 1892; Lake Wenache, *Sandberg & Leiberg* 631; Olympic Mountains, *Elmer* 2470.

Zonal distribution: Humid Transition and Canadian.

PTEROSPORA.

1. **Pterospora andromedea** Nutt. Gen. **1**: 269. 1818.

Type locality: "In Upper Canada near the Falls of Niagara."

Range: British Columbia to Canada, southward to California and Pennsylvania.

Specimens examined: Mount Rainier, *Piper*, August, 1895; Lake Chelan, *Lake & Hull*, August 24, 1892; Pend Oreille River, *Lyall* in 1859; Loon Lake, *Winston*; Lake Wenache, *Sandberg & Leiberg* 632; Blue Mountains, *Piper*, July 15, 1896; without locality, *Vasey* 375; Clallam County, *Elmer* 2462; Clarks Springs, *Kreager* 125.

ZONAL DISTRIBUTION: Canadian.

MONOTROPA.

1. **Monotropa uniflora** L. Sp. Pl. **1**: 387. 1753. INDIAN PIPE.

TYPE LOCALITY: "Habitat in Marilandia, Virginia, Canada."

RANGE: Alaska to Labrador, southward to California and Florida. Asia.

SPECIMENS EXAMINED: Snoqualmie, *Parker*, July 25, 1892; upper Nisqually River, *Piper*, August, 1895; Cascade Mountains to Colville, *Lyall* in 1860; Silverton, *Bouck*; west Klickitat County, *Suksdorf* 78; without locality, *Vasey* 376; Clallam County, *Elmer* 2436; Kalispel Lake, *Kreager* 348.

ZONAL DISTRIBUTION: Transition and Canadian.

HYPOPITYS.

1. **Hypopitys hypopitys** (L.) Small, Mem. Torr. Club. **4**: 137. 1894.

Monotropa hypopitys L. Sp. Pl. **1**: 387. 1753.

TYPE LOCALITY: "Habitat in Succiae, Germaniae, Angliae, Canadae sylvis. Parasitica radicum."

RANGE: British Columbia to New Brunswick, southward to Arizona and Florida. Europe. Asia.

SPECIMENS EXAMINED: Mount Rainier, *Flett* 238; *Piper* 2045; Baldy Peak, *Lamb* 1297; Wilkeson, *Flett* 32; Cascade Mountains, *Suksdorf* 199; Cascade Mountains to Colville, *Lyall* in 1860; Stampede Tunnel, *Henderson*, October 5,11892; Mount Adams, *Suksdorf*; Yakima Pass, *Watson* 261a; Nason Creek, *Sandberg & Leiberg* 623; Clallam County, *Elmer* 2464.

ZONAL DISTRIBUTION: Humid Transition, Canadian.

PLEURICOSPORA.

1. **Pleuricospora fimbriolata** A. Gray, Proc. Am. Acad. **7**: 369. 1868.

TYPE LOCALITY: "In or near the Mariposa *Sequoia gigantea* Grove," California.

RANGE: California to Washington.

SPECIMENS EXAMINED: Green River Hot Springs, *Piper*, July, 1888; Skamania County, *Suksdorf*, July 25, 1886.

ZONAL DISTRIBUTION: Humid Transition and Canadian.

HEMITOMES.

1. **Hemitomes congestum** A. Gray, Pac. R. Rep. **6^3**: 80. 1855.

Newberrya Torr. Ann. Lyc. N. Y. **8**: 55. 1867.

TYPE LOCALITY: "Upper Des Chutes Valley," Oregon. Collected by Newberry.

RANGE: Western Washington, western Oregon, and northern California.

SPECIMENS EXAMINED: Near Tacoma, *Flett*, October 2, 1897; Snoqualmie, *Miss Parker*, August 1, 1892; Mount Adams, *Suksdorf* 987; Seattle, *Tarleton* in 1894; Mount Elinor, *Jennie V. Getty*, August, 1902; Skamania County, *Suksdorf*, August 19, 1892 and 2168; without locality, *Geo. Gibbs*; Mount Storm King, *Lawrence* 339.

Doctor Gray referred the Gibbs specimen to *Newberrya spicata* A. Gray in the original description, but the specimen seems to us to be *N. congesta*.

ZONAL DISTRIBUTION: Canadian.

ERICACEAE. HEATHER FAMILY.

Fruit a berry or drupe.
  Calyx becoming large and fleshy; bark not red........... GAULTHERIA (p. 441).
  Calyx small; bark red.

Tree; berry many-seeded .... ARBUTUS (p. 437).
Shrub; drupe 5 to 10-seeded .... ARCTOSTAPHYLOS (p. 437).
Fruit a dry capsule.
Anther cells each tipped with a recurved awn.
Leaves opposite; style long, slender .... CASSIOPE (p. 438).
Leaves alternate; style short, stout .... HARRIMANELLA (p. 439).
Anther cells not appendaged.
Corolla gamopetalous.
Bracts firm, persistent; no scaly leaf-buds.
Leaves heath-like; corolla without pouches . PHYLLODOCE (p.439).
Leaves lanceolate; corolla with 10 pouches, which hold the anthers .... KALMIA (p. 439).
Bracts thin, deciduous; leaf-buds scaly.
Corolla funnel form, 5-lobed .... RHODODENDRON (p. 440).
Corolla globose, 4-toothed .... MENZIESIA (p. 440).
Corolla choripetalous; bracts deciduous.
Flowers white, umbelled; leaves evergreen...... LEDUM (p. 440).
Flowers coppery, solitary; leaves deciduous..... CLADOTHAMNUS (p. 442).

ARBUTUS.

1. **Arbutus menziesii** Pursh, Fl. **1**: 282. 1814. MADRONA.

TYPE LOCALITY: "On the northwest coast of America." Collected by Menzies.

RANGE: British Columbia to California along the coast.

SPECIMENS EXAMINED: Mat Mats Bay, *Binns;* Seattle, *Piper* in 1888.

ZONAL DISTRIBUTION: Humid Transition.

Not uncommon, especially on the bluffs along Puget Sound, and in similar situations where the trees receive abundant light.

ARCTOSTAPHYLOS.

Erect shrubs 1 to 2 meters high .... 1. *A. tomentosa.*
Prostrate creeping shrubs.
Leaves retuse at apex .... 2. *A. uva-ursi.*
Leaves cuspidate at apex .... 3. *A. nevadensis.*

1. **Arctostaphylos tomentosa** (Pursh) Dougl. Bot. Reg. **21**: *pl. 1791.* 1836. MANZANITA.

Arbutus tomentosa Pursh, Fl. **1**: 282. 1814.

TYPE LOCALITY: "On the North-west Coast of America." Collected by Menzies.

RANGE: Western Washington to California and Arizona.

SPECIMENS EXAMINED: Tacoma, *Flett,* April 20, 1896; McNeils Island, *Flett,* June, 1895; Mason County, *Piper* 898; Mount Constitution, *Henderson,* July 4, 1892; west Klickitat County, *Suksdorf* 985, 660; Olympic Mountains, *Elmer* 2473; Vancouver, *Piper,* September, 1902; Vancouver, *Piper* 4936.

ZONAL DISTRIBUTION: Humid transition.

Hooker [a] recognizes two forms of this species *A. tomentosa hispida* and *A. tomentosa nuda,* the former with hispid, the latter with smooth branchlets. The first form is apparently typical *A. tomentosa.*

2. **Arctostaphylos uva-ursi** (L.) Spreng. Syst. **2**: 287. 1825. KINNIKINNICK.

Arbutus uva-ursi L. Sp. Pl. **1**: 395. 1753.

TYPE LOCALITY: "Habitat in Europa frigida, Canada."

RANGE: Arctic regions, southward to Pennsylvania, New Mexico, and California. Europe. Asia.

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[a] Fl. Bor. Am. **2**: 37. 1834.

Specimens examined: Orchard Point, *Piper*, July, 1895; Tacoma, *Flett* 65; Mount Rainier, *Piper* 2058; Cascade Mountains, latitude 49°, *Lyall* in 1859; Loomis, *Elmer* 585; Conconully, *Whited* 1324; Cascade Mountains to Colville, latitude 49°, *Lyall* in 1860; Spokane, *Piper*, May 16, 1896, May 8, 1898; Hangman Creek, *Sandberg & Leiberg* 69; without locality, *Cooper*; Olympic Mountains, *Elmer* 2474; Spokane, *Kreager* 170; near Delight, *Cotton* 998.

Zonal distribution: Transition to Hudsonian.

3. **Arctostaphylos nevadensis** A. Gray, Syn. Fl. **2**^{1}: 27. 1878.

Type locality: "Sierra Nevada, California, common at 8–10000 feet."

Range: Washington to California in the Cascades and Sierras.

Specimens examined: Skagit Pass, *Lake & Hull*, August 24, 1892; Stampede Tunnel, *Henderson*, June 20, 1892; near Longmire Springs, *Piper* 2047; upper Nisqually Valley, *Allen* 110; Mount Adams, *Suksdorf*, July 12, 1886; Mount Stuart, *Sandberg & Leiberg* 548; west Klickitat County, *Suksdorf*, May 7, 1886; Roslyn, *Whited* 357; without locality, *Vasey* 379.

Zonal distribution: Hudsonian.

Arctostaphylos media Greene, Pittonia **2**: 171. 1891 Type locality: "On dry gravelly ground in Mason County," Washington. Collected by Piper. Range: Western Washington. Specimens examined: Port Orchard, *Patterson*; near Union City, *Piper* 899 (type). This plant is unquestionably a hybrid between *A. uva-ursi* and *A. tomentosa*. It occurs sparingly and only where both of the parents are abundant.

CASSIOPE.

Leaves with a deep dorsal furrow	1. *C. tetragona*.
Leaves not dorsally furrowed	2. *C. mertensiana*.

1. **Cassiope tetragona** (L.) D. Don, Edinb. New Phil. Journ. **17**: 158. 1834.

Andromeda tetragona L. Sp. Pl. **1**: 393. 1753.

Type locality: "Habitat in Alpibus Lapponicis."

Range: Alaska to Greenland, southward to Washington [Oregon?] and Hudson Bay. Asia.

Specimens examined: Cascade Mountains, latitude 49°, *Lyall* in 1860; Loomis, *Elmer*, August, 1897.

Zonal distribution: Hudsonian.

2. **Cassiope mertensiana** (Bong.) G. Don, Hist. Dichl. Pl. **3**: 829. 1834.

Andromeda mertensiana Bong. Mem. Acad. St. Petersb. VI. **2**: 152. 1832.

Andromeda cupressina Hook. Fl. Bor. Am. **2**: 30. 1838

Type locality: Sitka, Alaska.

Range: Alaska to California.

Specimens examined: Olympic Mountains, *Piper* 2184; *J. M. Grant;* Cascade Mountains to Colville, *Lyall* in 1860; Silverton, *Bouck* 124; Mount Rainier, *Flett* 302; *Allen* 202; *Piper* 2053; Mount Stuart, *Elmer* 1109; Mount Adams, *Henderson*, August 9, 1892; Stevens Pass, *Sandberg & Leiberg* 714; Horseshoe Basin, *Lake & Hull* 563.

Zonal distribution: Hudsonian.

Cassiope lycopodioides D. Don is included in Suksdorf's list, but the species is not known south of Alaska.

HARRIMANELLA. ALASKA HEATHER.

1. **Harrimanella stelleriana** (Pall.) Coville, Proc. Biol. Soc. Wash. **3**: 574. 1901.
Andromeda stelleriana Pall. Fl. Ross. 1^2: 58. 1788.
Cassiope stelleriana DC. Prod. 7^2: 611. 1839.
TYPE LOCALITY: Kamtschatka.
RANGE: Alaska to Mount Rainier. Siberia.
SPECIMENS EXAMINED: Mount Rainier, *Allen* 203; *Flett* 233; *Piper* 2050, August, 1895; Bridge Creek, *Elmer* 686.
ZONAL DISTRIBUTION: Hudsonian and Arctic.

PHYLLODOCE.

Corolla ovoid, yellowish.. 1. *P. glanduliflora.*
Corolla campanulate, red.. 2. *P. empetriformis.*

1. **Phyllodoce glanduliflora** (Hook.) Coville, Mazama **1**: 196. 1897.
Menziesia glanduliflora Hook. Fl. Bor. Am. **2**: 40. 1834.
Bryanthus glanduliflorus A. Gray, Proc. Am. Acad. **7**: 368. 1868.
TYPE LOCALITY: "Mountains north of Smoking River, Lat. 56°." Collected by Drummond.
RANGE: Sitka to Montana and Oregon.
SPECIMENS EXAMINED: Olympic Mountains, *Piper*, August, 1895; Mount Rainier, *Flett* 299; *Piper* 2052; *Allen*, July 20, 1892; Mount Stuart, *Brandegee* 945; Mount Adams, *Suksdorf* 434; *Parry & Suksdorf*, September 8, 1880; Horseshoe Basin, *Lake & Hull*, August 24, 1892; Bridge Creek, *Elmer* 870.
ZONAL DISTRIBUTION: Arctic.

2. **Phyllodoce empetriformis** (Smith) D. Don, Edinb. New Phil. Journ. **17**: 160. 1834.
Menziesia empetriformis Smith, Linn. Trans. **10**: 380. 1811.
Bryanthus empetriformis A. Gray, Proc. Am. Acad. **7**: 367. 1868.
TYPE LOCALITY: "On the west coast of North America." Collected by Menzies.
RANGE: British Columbia to Wyoming and California.
SPECIMENS EXAMINED: Olympic Mountains, *Grant* 22; Silverton, *Bouck* 123; Mount Rainier, *Piper* 2043; Paradise Valley, *Flett* 298; Goat Mountains, *Allen* 104; Baldy Peak, *Lamb* 1354; Mount Adams, *Henderson*, August 5, 1892; Stevens Pass, *Sandberg & Leiberg*, August, 1893; Cascade Mountains, latitude 49°, *Lyall* in 1859; Fish Lake, *Dunn*; Loomis, *Elmer* 573; Horseshoe Basin, *Lake & Hull* 562; Nason Creek, *Sandberg & Leiberg* 668; Entiat River, *Mrs. Howe;* Olympic Mountains, *Elmer* 2478.
ZONAL DISTRIBUTION: Arctic and Hudsonian.

KALMIA.

1. **Kalmia glauca** Ait. Hort. Kew. **2**: 64. 1789.
Kalmia glauca rosmarinifolia Pursh, Fl. **1**: 296. 1814.
TYPE LOCALITY: Newfoundland.
RANGE: Alaska to Newfoundland, south to California, the Great Lakes, and New Jersey.
SPECIMENS EXAMINED: Seattle, *Smith* 135; *Piper* in 1885; Tacoma, *Flett* 27; Nisqually Valley, *Allen* 4; Ilwaco, *Piper* 4949.
ZONAL DISTRIBUTION: Humid Transition.

1a. **Kalmia glauca microphylla** Hook. Fl. Bor. Am. **2**: 41. 1834.
Kalmia microphylla Heller, Bull. Torr. Club **25**: 581. 1898.
TYPE LOCALITY: "Swamps in the Rocky Mountains." Collected by Drummond.
RANGE: British Columbia to California and Colorado.
SPECIMENS EXAMINED: Mount Rainier, *Piper* 2090; *Allen* 96; Stevens Pass, *Sandberg & Leiberg* 718; Mount Stuart, *Elmer* 1103; Horseshoe Basin, *Lake & Hull* 771.
ZONAL DISTRIBUTION: Hudsonian.

RHODODENDRON.

Leaves evergreen; inflorescence terminal; flowers pink............... 1. *R. californicum.*
Leaves deciduous; inflorescence lateral; flowers white .... 2. *R. albiflorum.*

1. **Rhododendron californicum** Hook. Bot. Mag. **11**: *pl. 4863.* 1855.

Rhododendron macrophyllum G. Don, Hist. Dichl. Pl. **3**: 843. 1834.

Type locality: "From the mountains of California."

Range: Washington to California in the coast region.

Specimens examined: Whidby Island, *Gardner* 193; Mat Mats Bay, *Binns*, June 2, 1890; Goat Mountains, *Allen*, June, 1893; Seattle, *Piper*; near Union City, *Piper*; Clallam County, *Elmer* 2475.

Zonal distribution: Humid Transition.

This species is closely related to the eastern *R. maximum* L., to which Hooker once referred our plant.

2. **Rhododendron albiflorum** Hook. Fl. Bor. Am. **2**: 43. 1834.

Cladothamnus campanulatus Greene, Erythea **3**: 65. 1895.

Type locality: "Alpine woods of the Rocky Mts." Collected by Drummond.

Range: British Columbia to Oregon and Montana.

Specimens examined: Olympic Mountains, *Piper* 387; Cascade Mountains, latitude 49°, *Lyall* in 1859–60; Mount Rainier, *Piper* 2049; *Allen* 216, 309a; Mount Adams, *Suksdorf* 435; Cascade Mountains, *Henderson*, August 5, 1892; Stevens Pass, *Sandberg & Leiberg*, August, 1893; head of Twisp River, *Whited* 209; Bridge Creek, *Elmer* 712; Nason Creek, *Sandberg & Leiberg* 663; without locality, *Vasey* 365; Clallam County, *Elmer* 2461.

Zonal distribution: Hudsonian.

MENZIESIA.

1. **Menziesia ferruginea** Smith, Ic. Pl. **3**: *pl. 56.* 1791.

Menziesia urceolaris Salisb. Par. Lond. *pl. 44.* 1806.

Menziesia glabella A. Gray, Syn. Fl. **2**: 39. 1878.

Type locality: "In Americae borealis tractu occidentali copiosissime crescit." Collected by Menzies.

Range: Alaska to Oregon and Montana.

Specimens examined: Olympic Mountains, *Piper* 2186, 2185; *J. M. Grant* in 1889; Mason County, *Piper* 1079; Montesano, *Heller* 3868; Hoquiam, *Lamb* 1015; Cascade Mountains, latitude 49°, *Lyall;* Silverton, *Bouck* 121; Mount Rainier, *Piper*, August, 1895; Nisqually Valley, *Allen* 3; Mount Adams, *Flett* 1214; *Suksdorf* 587; Skamania County, *Suksdorf*, August 10, 1889; Stevens Pass, *Sandberg & Leiberg* 727; Stampede Tunnel, *Henderson* 2418; *Watson* 254; Markham, *Lamb* 1115; without locality, *Cooper;* Mount Carlton, *Kreager* 272; Ilwaco, *Piper* 4991.

Zonal distribution: Canadian to Hudsonian.

The characters relied upon by Doctor Gray to distinguish *M. glabella* break down completely.

LEDUM.

Leaves oval or oblong, not revolute-margined..................... 1. *L. glandulosum.*
Leaves lanceolate, the margins revolute.
  Rusty-tomentose beneath.................................. 2. *L. groenlandicum.*
  Glaucous beneath... 3. *L. columbianum.*

1. **Ledum glandulosum** Nutt. Trans. Am. Phil. Soc. **8**: 270. 1843.

Type locality: "In the central chain of the Rocky Mountains on the sides of mountains which close up Thornburg's ravine." Collected by Nuttall.

Range: British Columbia to California and Wyoming.

Specimens examined: Loomis, *Elmer* 574; near Lake Chelan, *Gorman* 583, 768.

Zonal distribution: Hudsonian.

2. Ledum groenlandicum Oeder, Fl. Dan. **4**: *pl. 567*. 1770. LABRADOR TEA.

Ledum latifolium Jacq. Coll. **2**: 308. 1788.

TYPE LOCALITY: "In Groenlandia."

RANGE: Alaska to Greenland, southward to New Jersey, Wisconsin, and Oregon.

SPECIMENS EXAMINED: Fidalgo Island, *Lyall* in 1858; Fairhaven, *Suksdorf* 986; Admiralty Head, *O. Piper*, May, 1898; Whidby Island, *Gardner* 194; Seattle, *Piper* 137; Tacoma, *Flett* 219.

ZONAL DISTRIBUTION: Humid Transition.

3. Ledum columbianum sp. nov.

Erect with erect branches, 60 to 90 cm. high; bark becoming smooth and brown; leaves oblong, reticulate, 4 to 6 cm. long, rather obtuse but apiculate, strongly revolute, dark green and glabrous above, whitish and resinous-dotted beneath, the midrib and short petiole minutely puberulent as well; corymbs terminal, convex, 3 to 5 cm. broad; pedicels slender, puberulent and resinous-dotted, recurved in fruit, 1.5 to 3 cm. long; lobes of the calyx very small, broadly rounded; petals white, oval, 5 to 6 mm. long, obtuse; stamens 5 to 7, the filaments sparsely hirsute at base; ovary minutely canescent and resinous-dotted; capsules oblong, acutish.

Collected by the writer in a sphagnum bog at Ilwaco, Pacific County, June 22, 1904 (no. 6451). The type is deposited in the U. S. National Herbarium. Also collected at Clatsop, Oreg., by Coville, September, 1, 1898 (no. 869).

This species is nearest related to *L. groenlandicum*, from which it may at once be distinguished by the absence of the tomentose pubescence. In this respect it resembles *L. glandulosum* alone, but the capsule characters are those of the former species. Its zonal position is apparently Humid Transition.

GAULTHERIA.

Corolla urceolate, filaments hairy; shrub 1 to 2 meters high.............. 1. *G. shallon*.
Corolla campanulate; filaments glabrous; shrubs 5 to 20 cm. high.
  Leaves ovate or subcordate, 2 to 4 cm. long.......................... 2. *G. ovatifolia*.
  Leaves oval, about 1 cm. long.................................... 3. *G. humifusa*.

1. Gaultheria shallon Pursh, Fl. **1**: 283. 1814. SALAL.

TYPE LOCALITY: "On the falls of the Columbia [i. e. Celilo] and near the Western Ocean" [mouth of Columbia]. Collected by Lewis.

RANGE: British Columbia to Central California west of the Cascades and Sierras.

SPECIMENS EXAMINED: Montesano, *Heller* 3870; Cascade Mountains, latitude 49°, *Lyall*; upper Nisqually Valley, *Allen* 102; Yakima Pass, *Watson* 251; Skamania County, *Suksdorf* 1540; without locality, *Vasey* 381; without locality, *Cooper*; Olympic Mountains, *Elmer* 2477; Seattle, *Piper*.

ZONAL DISTRIBUTION: Humid Transition.

2. Gaultheria ovatifolia A. Gray, Proc. Am. Acad. **19**: 85. 1883.

TYPE LOCALITY: "Wooded banks of streams and cañons of the Cascade Mountains, borders of British Columbia, Washington Territory, and N. Oregon."

RANGE: British Columbia to Oregon and North Idaho.

SPECIMENS EXAMINED: Olympic Mountains, *Piper* 2187; Cascade Mountains, latitude 49°, *Lyall* in 1859; upper Nisqually Valley, *Allen* 101a; Mount Rainier, *Piper* 2055; *Flett* 250; Mount Adams, *Suksdorf* 154; Stampede Tunnel, *Henderson*, June 25, October 4, 1892; Yakima Pass, *Watson* 252; Goose Lake, *Flett* 1218; Pend Oreille River, *Lyall* in 1860; without locality, *Vasey* 380; Box Canyon, Pend Oreille River, *Kreager* 398.

ZONAL DISTRIBUTION: Canadian and Hudsonian.

3. Gaultheria humifusa (Graham) Rydberg, Mem. N. Y. Bot. Gard. **1**: 300. 1900.

Vaccinium humifusum Graham, Edinb. N. Phil. Journ. **1831** (Apr.-Oct.): 193. 1831.

Gaultheria myrsinites Hook. Fl. Bor. Am. **2**: 35. *t. 129*. 1834.

TYPE LOCALITY: Type raised from seed collected by Drummond in the Rocky Mountains of British America.

RANGE: British Columbia to Colorado and California.

SPECIMENS EXAMINED: Mount Rainier, *Piper* 2044; Mount Adams, *Suksdorf* 153; Kittitas County, *Sandberg & Leiberg* 706.

ZONAL DISTRIBUTION: Hudsonian.

CLADOTHAMNUS.

1. **Cladothamnus pyrolaeflorus** Bong. Mem. Acad. St. Petersb. VI. **2**: 155. *t. 1.* 1832.

Tolmiea occidentalis Hook. Fl. Bor. Am. **2**: 45. 1834.

TYPE LOCALITY: Sitka, Alaska.

RANGE: Alaska to Oregon.

SPECIMENS EXAMINED: Cascade Mountains, latitude 49°, *Lyall* in 1859; Baldy Peak, *Lamb* 1368.

ZONAL DISTRIBUTION: Hudsonian.

VACCINIACEAE. BLUEBERRY FAMILY.

Erect shrubs; corolla cylindric or urceolate.......................... VACCINIUM.
Trailing vines; corolla deeply 4-cleft, the lobes spreading.............. OXYCOCCUS.

VACCINIUM. BLUEBERRY.

- Leaves evergreen; filaments hairy.................................. 1. *V. ovatum.*
- Leaves deciduous; filaments glabrous.
  - Flowers in clusters of 2 to 4; corolla mostly 4-lobed; calyx deeply 4 or 5-parted.
    - Leaves thick, prominently veiny, obtuse or retuse......... 2. *V. uliginosum.*
    - Leaves thinner, obscurely veiny, obtuse or acute .... 3. *V. occidentale.*
  - Flowers solitary; corollas mostly 5-lobed; calyx obscurely lobed.
    - Low shrubs, less than one-half meter high.
      - Branches sharply angled; berries red or wine-color.... 4. *V. scoparium.*
      - Branches terete; berries blue with a bloom.
        - Leaves rather thin, bright green on both sides; corolla ovate or oblong........................ 5. *V. caespitosum.*
        - Leaves thicker, pale and glaucescent; corolla globose...................................... 6. *V. deliciosum.*
    - Taller shrubs 1 to 3 meters high.
      - Leaves serrate; berries blackish without bloom .... 7. *V. macrophyllum.*
      - Leaves entire.
        - Berries blue with a bloom .... 8. *V. ovalifolium.*
        - Berries red .... 9. *V. parvifolium.*

1. **Vaccinium ovatum** Pursh, Fl. **1**: 290. 1814.

TYPE LOCALITY: "On the Columbia River." Collected by Lewis, the exact spot Fort Clatsop near Astoria, Oregon.

RANGE: British Columbia to California, west of the Cascades and Sierras.

SPECIMENS EXAMINED: Montesano, *Heller* 3942; Grays Harbor City, *Lamb* 1037; Olympia, *Henderson*, May, August, 1892; Admiralty Head, *O. Piper*, April 24, 1898; near Lake Washington, *Suksdorf* 984; Seattle, *Suksdorf* 984; Port Ludlow, *Einns;* Tacoma, *Flett* 59; without locality, *Cooper*.

ZONAL DISTRIBUTION: Humid Transition.

Very variable as to fruit, being black and shiny or blue and glaucous. The berries vary likewise in flavor and texture.

2. **Vaccinium uliginosum** L. Sp. Pl. **1**: 350. 1753.

Type locality: "Habitat in Sueciae borealibus et alpinis, uliginosis."

Range: Arctic regions, southward to Oregon, Lake Superior, and New York. Europe.

Specimens examined: Mount Constitution, *Henderson*, July 4, 1892.

Zonal distribution: Hudsonian.

3. **Vaccinium occidentale** A. Gray, Bot. Cal. **1**: 451. 1876.

Type locality: "Sierra Nevada at 6000 or 7000 feet, from Mariposa to Sierra Co.," California. "Mountains of Utah."

Range: Washington to Idaho, southward to California and Utah.

Specimens examined: Simcoe Mountains, *Howell* 330; Mount Adams, *Suksdorf*, August, 1886; White Salmon, *Suksdorf* 1878; Signal Peak, *Henderson*, August 13, 1892.

Zonal distribution: Canadian.

4. **Vaccinium scoparium** Leiberg, Mazama **1**: 196. 1897.

Vaccinium myrtillus microphyllum Hook. Fl. Bor. Am. **2**: 33. 1834.

Vaccinium microphyllum Rydberg, Bull. Torr. Club **24**: 251. 1897, not Reinw. 1826.

Type locality: "Alpine woods near the Height of Land and Columbia Portage." Collected by Drummond.

Range: British Columbia to California and Colorado.

Specimens examined: Mount Rainier, *Piper* 2054; Goat Mountains, *Allen* 219; mountains north of Ellensburg, *Whited* 765; Wenache Mountains, *Whited* 1241; Mount Stuart, *Elmer* 1175; Big Klickitat River, *Henderson*, August 4, 1892; Stevens Pass, *Sandberg & Leiberg* 741; Blue Mountains, *Piper*, July, 1896.

Zonal distribution: Hudsonian and Canadian.

5. **Vaccinium caespitosum** Michx. Fl. **1**: 234. 1803.

Vaccinium caespitosum cuneifolium Nutt.; A. Gray, Syn. Fl. **2^1**: 24. 1878.

Vaccinium caespitosum arbuscula A. Gray, Syn. Fl. **2^1**: 24. 1878.

Type locality: "In borealibus Americae, praesertim circa sinum Hudsonis."

Range: Alaska to Labrador, southward to California, Colorado, and New England.

Specimens examined: Near Union City, *Piper* 1078; Humptulips, *Lamb* 1188; Segualiche Lake, *Piper* 269; Snoqualmie Falls, *Piper* 717; Simcoe Mountains, *J. Howell*, June, 1879; Falcon Valley, *Suksdorf* 584; Columbia Plains, *Nuttall;* Lake Wenache, *Sandberg & Leiberg* 635; Hangman Creek, *Sandberg & Leiberg* 78; Pullman, *Piper* 1720; *Elmer* 183; without locality, *Vasey* 382.

Zonal distribution: Transition.

6. **Vaccinium deliciosum** Piper, Mazama **2**: 103. 1901.

Type locality: Mount Rainier, Washington.

Range: Cascade and Olympic Mountains, Washington.

Specimens examined: Olympic Mountains, *Piper* in 1895; Cascade Mountains, latitude 49°, *Lyall;* Mount Rainier, *Allen* 217; *Piper* 2056; Mount Adams, *Henderson*, August 12, 1892; *Suksdorf* 585, 198; Stevens Pass, *Sandberg & Leiberg* 746; Olympic Mountains, *Elmer* 2460.

Zonal distribution: Hudsonian.

7. **Vaccinium macrophyllum** (Hook.).

Vaccinium myrtilloides macrophylla Hook. Fl. Bor. Am. **2**: 32. 1834.

Vaccinium membranaceum Dougl.; Hook. loc. cit., as synonym.

Type locality: "N. W. Coast." Collected by Menzies.

Range: British Columbia and Oregon to Lake Superior.

Specimens examined: Olympic Mountains, *J. M. Grant* in 1889; Cascade Mountains, latitude 49°, *Lyall* in 1859; Skagit Pass, *Lake*, August 24, 1892; Mount Rainier, *Piper* 2057; *Allen* 218; Mount Adams, *Suksdorf* 77 and July 13, 1886; *Flett* 1217; Wenache Lake, *Sandberg & Leiberg* 688; head of Twisp River, *Whited*, July 19, 1896; Stevens Pass, *Sandberg & Leiberg* 744; Stampede Tunnel, *Henderson*, June 20, 1892; above Lake Chelan, *Lake & Hull* 561; Blue Mountains, *Piper*, July 16, 1896; without locality, *Vasey* 385; *Kreager* 233.

Zonal distribution: Canadian mainly.

The form in the Blue Mountains and the Bitterroots tends to have the leaves pale or glaucous beneath. This seems to be *V. globulare* Rydberg, but we do not deem it distinct enough to be worthy of nomenclatorial recognition.

8. Vaccinium ovalifolium Smith, Rees' Cycl. **36**: no. 2. 1817.

Type locality: "Brought by Mr. Menzies from the west coast of North America."

Range: Alaska to Lake Superior and Oregon.

Specimens examined: Montesano, *Heller* 3892; Mount Rainier, *Piper*, August, 1895; Nisqually Valley, *Allen* 220a, 220; Mount Adams, *Suksdorf* 152; Big Creek prairies, *Lamb* 1410; Stampede Tunnel, *Henderson*, June, October, 1892; Stevens Pass, *Sandberg & Leiberg* 786; Skamania County, August 10, 1886; without locality, *Vasey* 384; Stevens Pass, *Whited* 1455.

Zonal distribution: Canadian.

9. Vaccinium parvifolium Smith, Rees' Cycl. **36**: no. 3. 1817. Red huckleberry.

Type locality: "Gathered by Mr. Menzies on the west coast of North America."

Range: Alaska to California west of the Cascade Mountains.

Specimens examined: Hoquiam, *Lamb* 1016; Grays Harbor City, *Lamb* 1214; Montesano, *Heller* 3869; Admiralty Head, *O. Piper*, April 3, 1898; Port Ludlow, *Binns*, May 15, 1890; Cascade Mountains, latitude 49°, *Lyall* in 1859; Silverton, *Bouck;* Tacoma, *Flett* 40; upper Nisqually Valley, *Allen* 71; Yakima Pass, *Watson* 250; Mount Adams, *Suksdorf* 586; Vancouver, *Suksdorf* 151; without locality, *Cooper;* Clallam County, *Elmer* 2459; Fort Vancouver, *Douglas*, *Scouler*.

Zonal distribution: Humid Transition and Canadian.

OXYCOCCUS.

1. Oxycoccus oxycoccus intermedius (A. Gray). Western cranberry.

Vaccinium oxycoccus intermedium A. Gray, Syn. Fl. ed. 2. $\mathbf{2}^1$: 396. 1886.

Type locality: "Washington Territory and N. Oregon." Collected by Suksdorf and by Henderson.

Range: British Columbia to northern Idaho and western Oregon.

Specimens examined: Seattle, *Piper*, May, 1891; Tacoma, *Flett* 224; Klickitat County, *Suksdorf;* mouth of Columbia, *Douglas*.

Zonal distribution: Humid Transition.

PRIMULACEAE. Primrose Family.

Stems short; leaves in a basal rosette.
Corolla lobes reflexed; stamens exserted.................... Dodecatheon (p. 445).
Corolla salverform; stamens included........................ Douglasia (p. 447).
Stems leafy; corolla rotate or wanting.
Flowers sessile or nearly so, solitary-axillary.
Corolla none; capsule dehiscent by valves; leaves usually opposite.................................... Glaux (p. 447).
Corolla present; capsule circumscissile; leaves usually alternate.................................... Centunculus (p. 447).
Flowers not solitary-axillary or if so long-petioled.
Leaves clustered near the summit of the stem .... Trientalis (p. 447).
Leaves opposite not clustered.
Flowers solitary-axillary; leaves not punctate...... Steironema (p. 448).
Flowers in axillary spikes; leaves punctate .... Naumburgia (p. 448).

DODECATHEON. SHOOTING STAR.

Capsule dehiscing by valves from the apex.
  Filaments united into a yellow tube half as long as the anthers.
    Plant glabrous .... 1. *D. vulgare.*
    Plant puberulent .... 2. *D. puberulum.*
  Filaments free.
    Flowers white; leaves dentate .... 3. *D. dentatum.*
    Flowers purple; leaves entire .... 4. *D. campestre.*
Capsule circumscissile; filaments free or nearly so, black.
  Flowers normally tetramerous .... 5. *D. tetrandrum.*
  Flowers normally pentamerous.
    Herbage viscid-puberulent .... 6. *D. viscidum.*
    Herbage glabrous.
      Capsules ovate.
        Leaves broadly elliptic to obovate ...... 7. *D. latifolium.*
        Leaves oblong-lanceolate, crenate ...... 9. *D. jeffreyi.*
      Capsules cylindric.
        Leaves spatulate-oblong, obtuse .... 8. *D. conjugens.*
        Leaves lanceolate, acute .... 8a. *D. conjugens leptophyllum.*

1. Dodecatheon vulgare (Hook.)

Dodecatheon integrifolium Michx. err. det. Hook. Fl. Bor. Am. **2**: 118. 1838.

Dodecatheon integrifolium vulgare Hook. l. c.

Dodecatheon meadia pauciflorum Durand, Pl. Pratt. 95. 1855.

Dodecatheon pauciflorum Greene, Pittonia **2**: 72. 1890.

TYPE LOCALITY: "Woody country of the Hudson's Bay territories to Carlton House Fort, and in prairies of the Rocky Mountains."

RANGE: Washington to Saskatchewan and New Mexico.

SPECIMENS EXAMINED: Coupeville, *Gardner* 201; Admiralty Head, *Piper*, May, 1893; Orcas Island, *Lyall* in 1859; Pullman, *Piper* 1730; *Elmer* 174; Toppenish, *Cotton* 1137.

ZONAL DISTRIBUTION: Transition.

2. Dodecatheon puberulum (Nutt.)

Dodecatheon meadia puberula Nutt. Journ. Acad. Phila. **7**: 48. 1834.

Dodecatheon cusickii Greene, Pittonia **2**: 73. 1890.

Dodecatheon puberulentum Heller, Bull. Torr. Club **24**: 311. 1897.

TYPE LOCALITY: "Near the borders of Flathead river."

RANGE: British Columbia to Oregon and Idaho.

SPECIMENS EXAMINED: Rock Lake, *Sandberg & Leiberg*, May, 1893; Pasco, *Hindshaw* 5; Spangle, *Piper*, May 24, 1898; Spokane, *Nelson* 2880; *Piper*, May 16, 1896; Waitsburg, *Horner* 117; Kamiak Butte, *Moore*, June 4, 1893; Pullman, *Piper* 1814, 1730; *Elmer* 174; Almota, *Piper* 1793; White Salmon, *Suksdorf* 280; Wenache, *Whited* 1018; Rattlesnake Mountains, *Cotton* 357.

ZONAL DISTRIBUTION: Arid Transition.

The types of *meadia puberula* and *puberulentum* are identical, the whole plant excepting the blades being puberulent. The type of *cusickii* has the whole herbage puberulent, but otherwise is the same. Both forms occur together and thus the difference seems of no value.

3. Dodecatheon dentatum Hook. Fl. Bor. Am. **2**: 119. 1838.

Dodecatheon meadia latilobum A. Gray, Syn. Fl. **2**[1]: 58. 1878.

TYPE LOCALITY: "N. W. interior." Collected by Douglas.

RANGE: British Columbia to Utah.

SPECIMENS EXAMINED: Wenache Mountains, *Elmer* 438; *Brandegee* 956; Cascade Mountains, latitude 49°, *Lyall* in 1860; Icicle Creek, *Sandberg & Leiberg* 558; without locality, *Vasey* in 1889; Cape Horn, *Piper* 4974.

4. Dodecatheon campestre Howell, Fl. N. W. Am. **1**: 432. 1901.

? *Dodecatheon integrifolium minus* Hook. Fl. Bor. Am. **2**: 119. 1838.

TYPE LOCALITY: "In prairies on the Klickitat Hills, Klickitat Co., Washington."

RANGE: Eastern Washington.

SPECIMENS EXAMINED: West Klickitat County, *Suksdorf* 290; Fort Colville, *Lyall*; plains of the Columbia River, *Nuttall*.

This is the species to which Nuttall first applied the herbarium name of *ellipticum*, but in describing what he thought to be Nuttall's *D. ellipticum*, Durand really described the plant later named *D. patulum* Greene.

5. Dodecatheon tetrandrum Suksdorf, Erythea **3**: 40. 1895.

TYPE LOCALITY: Chiquash Mountains, Washington.

RANGE: Washington and Oregon.

SPECIMENS EXAMINED: Chiquash Mountains, *Suksdorf* 998; Mount Adams, *Suksdorf* August 7, 1885; Skamania County, August 11, 1886, *Suksdorf*.

ZONAL DISTRIBUTION: Hudsonian.

6. Dodecatheon viscidum Piper, Bull. Torr. Club **28**: 43. 1901.

TYPE LOCALITY: "Ten miles west of Spangle," Washington.

RANGE: Eastern Washington.

SPECIMENS EXAMINED: Spangle, Piper 3542; ten miles west of Spangle, *Piper* 2832.

ZONAL DISTRIBUTION: Arid Transition.

7. Dodecatheon latifolium (Hook.)

Dodecatheon integrifolium latifolium Hook. Fl. Bor. Am. **2**: 119. 1838.

Dodecatheon hendersoni A. Gray, Bot. Gaz. **2**: 232. 1886.

TYPE LOCALITY: "Dry banks about Fort Vancouver on the Columbia."

RANGE: Washington to California.

SPECIMENS EXAMINED: Coupeville, *Gardner* 200; Tacoma, *Flett* 91.

ZONAL DISTRIBUTION: Humid Transition.

8. Dodecatheon conjugens Greene, Erythea **3**: 40. 1895.

TYPE LOCALITY: "On dry hills near Helena, Montana."

RANGE: Washington and Oregon to Montana.

SPECIMENS EXAMINED: White Salmon, *Suksdorf* 289; west Klickitat County, *Suksdorf* 160; Ellensburg, *Whited* 280; Waitsburg, *Horner* 116; Pullman, *Piper* 2017; *Moore* 1731; *Elmer* 175; Klickitat Hills, *Howell* 1942; *Gorman*, April, 1895.

ZONAL DISTRIBUTION: Arid Transition.

8a. Dodecatheon conjugens leptophyllum (Suksdorf).

Dodecatheon hendersoni leptophyllum Suksdorf, Deutsch. Bot. Monatss. **18**: 132. 1900.

TYPE LOCALITY: Falcon Valley, Klickitat County, Washington.

RANGE: Eastern Washington.

SPECIMENS EXAMINED: Falcon Valley, *Suksdorf* 2202; near Mount Adams, *Flett* 1210; Okanogan County, *Whited* 57.

9. Dodecatheon jeffreyi Van Houtte, Fl. de Serres **16**: 99. 1865.

Dodecatheon viviparum Greene, Erythea **3**: 38. 1895.

Dodecatheon crenatum Greene, Pittonia **2**: 74. 1890.

TYPE LOCALITY: "Montagnes-Rocheuses."

RANGE: British Columbia to Oregon and Idaho.

SPECIMENS EXAMINED: Olympic Mountains, *Piper* 2223; Mount Rainier, *Greene* in 1890, *Piper* 2102; Baldy Peak, *Lamb* 1357; Skagit Pass, *Lake & Hull* 455; Stevens Pass, *Sandberg & Leiberg* 713.

ZONAL DISTRIBUTION: Hudsonian.

The illustration in the Flora de Serres seems to be exactly the plant common in the Bitterroot Mountains, of Idaho, so far as one may judge from the flowering plant alone. The Cascade Mountains plant (*D. viviparum*) differs only in having the leaves obscurely crenate instead of entire or denticulate. The capsule characters are the same in both

DOUGLASIA.

Leaves canescent with forked hairs	1. *D. dentata.*
Leaves glabrous or nearly so	2. *D. laevigata.*

1. **Douglasia dentata** S. Wats. Proc. Am. Acad. **17**: 375. 1882.

Douglasia nivalis dentata A. Gray, Syn. Fl. ed. 2. **2** ¹: 399. 1886.

Androsace dieckiana Haussk. Mitt. des Bot. Ver. für gesammt-Thuringen **1890**: 22. 1890.

TYPE LOCALITY: "On a dry ridge above Peshastin Cañon," Washington. Collected by Watson.

RANGE: In the Wenache region, Washington.

SPECIMENS EXAMINED: Mount Stuart, *Elmer* 1230; *Sandberg & Leiberg* 545; Wenache Mountains, *Whited* in 1896; Wenache Region, *Brandegee* 952; Yakima Region, *Brandegee;* Peshastin Canyon, *Watson* 264; Kittitas County, *Henderson* 2365; Clealum, *Henderson* in 1892; without locality, *Vasey* in 1889.

2. **Douglasia laevigata** A. Gray, Proc. Am. Acad. **16**: 105. 1880.

TYPE LOCALITY: Mount Hood, Oregon. Collected by Howell.

RANGE: Washington and Oregon.

SPECIMENS EXAMINED: Olympic Mountains, *Piper*, August, 1895; *Flett* 804; *Henderson* July, 1890, 2366; *J. M. Grant* in 1889; *Elmer* 2801; Goat Mountains, *Allen* 187.

ZONAL DISTRIBUTION: Hudsonian.

DOUGLASIA NIVALIS Lindl., listed by Suksdorf, is not known west of the Rocky Mountains.

GLAUX.

1. **Glaux maritima** L. Sp. Pl. **1**: 207. 1753.

TYPE LOCALITY: Europe.

RANGE: Sea coasts, California to Alaska and New England to Greenland. Europe. Asia.

SPECIMENS EXAMINED: Westport, *Henderson*, June 25, 1892; Whidby Island, *Gardner* 199; Seattle, *Piper*; Whatcom County, *Suksdorf* 989; without locality, *Cooper*.

The last three specimens are referable to *G. maritima obtusifolia* Fernald,[a] differing from the species in its more erect habit, simple or sparingly branched stems, and broader leaves.

ZONAL DISTRIBUTION: Humid Transition.

CENTUNCULUS.

1. **Centunculus minimus** L. Sp. Pl. **1**: 116. 1753.

TYPE LOCALITY: "Habitat in Italiae, Galliae, Scaniae arenosis."

RANGE: Washington to Illinois, south to Florida and Texas. South America. Europe.

SPECIMENS EXAMINED: Falcon Valley, *Suksdorf*, June, 1880; Spokane, *Piper* 2765; Silver Lake, *Henderson*, July 13, 1892; Lake Kalispel, *Kreager* 322.

ZONAL DISTRIBUTION: Arid Transition.

TRIENTALIS. STAR FLOWER.

Leaves crowded near the summit of the stem	1. *T. latifolia.*
Leaves scattered along the stem; bog plant	2. *T. arctica.*

1. **Trientalis latifolia** Hook. Fl. Bor. Am. **2**: 121. 1838.

Trientalis europaea latifolia Torr. Proc. Am. Acad. **4**: 118. 1860.

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[a] Rhodora **4**: 215. 1902.

TYPE LOCALITY: "About Fort Vancouver. Wallawallah River." Collected by Tolmie.

RANGE: Vancouver Island to North California and the Blue Mountains.

SPECIMENS EXAMINED: Montesano, *Heller* 3880; Hoquiam, *Lamb* 1051; San Juan Island, *Lyall* in 1859; Seattle, *Piper* 150; Tacoma, *Flett* 11; Olympia, *Henderson*, May 25, 1892; Skokomish Valley, *Kincaid*, May 10, 1892; upper Nisqually Valley, *Allen* 22; Silverton, *Bouck* 137; Nason Creek, *Sandberg & Leiberg* 650; lower Cascade Mountains, *Suksdorf*, May 30, 1886; Roslyn, *Whited* 412; Nason City, *Sandberg & Leiberg*, August, 1893; Blue Mountains, *Horner* 52; without locality, *Vasey* in 1889.

ZONAL DISTRIBUTION: Humid Transition and Canadian.

In Cooper's Report [a] this plant was referred to as *T. europaea.*

2. **Trientalis arctica** Fisch.; Hook. Fl. Bor. Am. **2**: 121. 1838.

Trientalis europea arctica Ledeb. Fl. Ross. **3**: 25. 1847.

TYPE LOCALITY: "Western shore and islands, from Sandy Bay, in Clarence Straits, to Unalaschka."

RANGE: Alaska to Oregon.

SPECIMENS EXAMINED: Clallam County, *Elmer* 2799; Whidby Island, *Gardner* 198; Fidalgo Island, *Lyall* in 1859; Mount Constitution, *Henderson*, July 4, 1892; upper Nisqually Valley, *Allen* 20; Tacoma, *Flett* 317; Skamania County, *Suksdorf* 1528; Ilwaco, *Henderson; Piper* 5022; Stevens Pass, *Sandberg & Leiberg* 733; Blue Mountains, *Piper*, July, 1896.

ZONAL DISTRIBUTION: Humid Transition.

STEIRONEMA.

1. **Steironema ciliatum** (L.) Raf. Ann. Gen. Phys. **7**: 192. 1820.

Lysimachia ciliata L. Sp. Pl. **1**: 147. 1753.

TYPE LOCALITY: Habitat in Virginia, Canada.

RANGE: British Columbia to Nova Scotia, south to New Mexico and Georgia.

SPECIMENS EXAMINED: Wenache, *Whited* 1424; Cascade Mountains, 49°, *Lyall* in 1859; White Salmon, *Suksdorf* 443; along Methow River, *Whited* 177; Lake Chelan, *Lake & Hull* 456; Pend Oreille River, *Kreager*, August, 1902; Clarks Springs, *Kreager* 131; Spokane, *Kreager* 546; *Piper*, September, 1896; *Henderson*, July 9, 1892; Pullman, *Piper* 1729; without locality, *Vasey* in 1889; Mabton, *Cotton* 751.

ZONAL DISTRIBUTION: Arid Transition and Upper Sonoran.

NAUMBURGIA.

1. **Naumburgia thyrsiflora** (L.) Duby in DC. Prod. **8**: 60. 1844.

Naumburgia guttatta Moench, Meth. Suppl. 23. 1802.

Lysimachia thyrsiflora L. Sp. Pl. **1**: 147. 1753.

TYPE LOCALITY: Europe.

RANGE: Alaska to Labrador, south to Oregon and Pennsylvania. Europe. Asia.

SPECIMENS EXAMINED: Cascade Mountains, latitude 49°, *Lyall* in 1859; Whatcom County, *Gardner* 407; Falcon Valley, *Suksdorf* 442; Toppenish, *Henderson* 2425; junction Crab and Wilson Creeks, *Sandberg & Leiberg* 270; Rock Lake, *Lake & Hull* 685.

ZONAL DISTRIBUTION: Upper Sonoran and Transition.

PRIMULA HORNEMANNIANA Lehm. is said to have been collected at Fort Vancouver by Garry. [b] This is evidently an error, as the species is not known to occur west of the Rocky Mountains.

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[a] Page 66.

[b] Hook. Fl. Bor. Am. **2**: 121. 1832.

PLUMBAGINACEAE.

STATICE.

1. **Statice armeria** L. Sp. Pl. **1**: 274. 1753. THRIFT.

Armeria vulgaris Willd. Enum. 333. 1809.

TYPE LOCALITY: "Habitat in Europae Americae septentrionalis campis."

RANGE: Subarctic regions, south to California and Labrador. South America. Europe. Asia.

SPECIMENS EXAMINED: Whidby Island, *Gardner* 196; Olympia, *Kincaid*, July 4, 1896; Roy, *Allen*, May 13, 1889; Yelm Prairie, *Piper;* Stuart Island, *Lawrence* 201; Port Crescent, *Lawrence* 260.

ZONAL DISTRIBUTION: Humid Transition.

OLEACEAE.

FRAXINUS.

1. **Fraxinus oregana** Nutt. Sylva **3**: 59. *pl. 99.* 1849. OREGON ASH.

Fraxinus oregana riparia Nutt. loc. cit.

TYPE LOCALITY: "In the Oregon territory." "We never saw it above the first falls of the Oregon." Collected by Nuttall.

RANGE: British Columbia to California, in the coast region.

SPECIMENS EXAMINED: Seattle, *Piper*, June, 1892; Satsop, *Heller* 4024; White Salmon *Suksdorf* 445.

A common tree in the river valleys of western Washington.

ZONAL DISTRIBUTION: Humid Transition.

GENTIANACEAE. GENTIAN FAMILY.

Style filiform, usually deciduous; anthers oblong to linear, mostly twisting or curving with age.................................... CENTAURION (p. 449).
Style stout and persistent or none; anthers remaining straight.
  Corolla funnelform or bell-shaped, without glands............. GENTIANA (p. 450).
  Corolla rotate, with a fringed glandular spot on each lobe..... FRASERA (p. 451).

CENTAURION.

Basal leaves in a rosette; introduced................................ 1. *C. centaurium.*
Basal leaves not in rosettes.
  Pedicels slender, much longer than the flowers.................. 2. *C. exaltata.*
  Pedicels mostly shorter than the flowers........................ 3. *C. muehlenbergii.*

1. **Centaurion centaurium** (L.) W. F. Wight.

Gentiana centaurium L. Sp. Pl. **1**: 229. 1753.

Erythraea centaurium Pers. Syn. **1**: 283. 1805.

TYPE LOCALITY: Europe.

SPECIMENS EXAMINED: Olympia, *Kincaid*, July 4, 1896; Yesler, *Hindshaw*, July, 1897.

2. **Centaurion exaltatum** (Griseb.) W. F. Wight.

Cicendia exaltata Griseb. in Hook. Fl. Bor. Am. **2**: 69. 1838.

Erythraea douglasii A. Gray, Bot. Cal. **1**: 480. 1876.

Erythraea exaltata Coville, Contr. Nat. Herb. **4**: 150. 1893.

TYPE LOCALITY: "Between the Kettle Falls, and 'Narrows' of the Columbia River." Collected by Douglas.

RANGE: Eastern Washington to California and Utah.

Specimens examined: Chelan, *Elmer* 497, Walla Walla Region, *Brandegee* 957; Prosser, *Cotton* 658; Rattlesnake Mountains, *Cotton* 665.

Zonal distribution: Upper Sonoran.

3. Centaurion muehlenbergii (Griseb.) W. F. Wight.

Erythraea muehlenbergii Griseb. Gen. & Sp. Gent. 146. 1839.

Erythraea curvistaminea Wittrock, Erythr. Exsicc. **2**: 21. 1885.

Type locality: "California." Collected by Douglas.

Range: Washington to California.

Specimens examined: Pullman, *Piper* 2649, 1622; *Henderson* 2272; Falcon Valley, *Suksdorf*, August 4, 1893.

Zonal distribution: Arid Transition.

GENTIANA. Gentian.

- Annual: corolla without appendages in the sinuses........................ 1. *G. acuta.*
- Perennial: corolla with appendages in the sinuses.
  - Uppermost pair of leaves forming an involucre about the 1 to 3 flowers. 2. *G. calycosa.*
  - Uppermost leaves not involucrate.
    - Corolla appendages entire.. 3. *G. sceptrum.*
    - Corolla appendages laciniately cleft.
      - Calyx lobes oblong to ovate-lanceolate.................. 4. *G. oregana.*
      - Calyx lobes linear to narrowly lanceolate.................. 5. *G. affinis.*

1. Gentiana acuta Michx. Fl. **1**: 177. 1803.

Gentiana amarella acuta Herder, Act. Hort. Petrop. **1**: 428. 1872.

Gentiana anisosepala Greene, Pittonia **3**: 309. 1898.

Amarella anisosepala Greene, Leaflets **1**: 53. 1904.

Amarella macounii Greene, op. cit. 54.

Type locality: "In altis montibus Carolinae et in Canada, prope Tadoussack."

Range: Alaska to Labrador, southward to Maine, Minnesota, New Mexico, and California.

Specimens examined: Padden Lake, *Suksdorf* 990; Cascade Mountains, 49°, *Lyall* in 1859; Whidby Island, *Gardner* 202; Fidalgo Island, *Flett* 2111; East Sound, *Henderson*, July 3, 1892.

Zonal distribution: Transition.

2. Gentiana calycosa Griseb. in Hook. Fl. Bor. Am. **2**: 58. *t. 146.* 1838.

Gentiana calycosa stricta Griseb. loc. cit.

Gentiana gormani Howell, Fl. N. W. Am. **1**: 446. 1901.

Type locality: "Mt. Rainier," Washington. Collected by Tolmie.

Range: British Columbia to California and Montana.

Specimens examined: Olympic Mountains, *Piper* 2224; *Elmer* 2727; Mount Rainier, *Piper* 2113; *Allen* 93; Baldy Peak, Olympic Mountains, *Lamb* 1332; Mount Adams, *Henderson* 33 and August 8, 1892; *Suksdorf* in 1878; Bridge Creek, *Elmer* 714; Horseshoe Basin, *Lake & Hull* 551; *Gorman* 757 (type collection of *Gentiana gormani* Howell).

Zonal distribution: Arctic.

In Lyall's report this species was confused with the Rocky Mountains *G. parryi* Engelm.

3. Gentiana sceptrum Griseb. in Hook. Fl. Bor. Am. **2**: 57. 1838.

Type locality: "Plentiful in low moist soil near Fort Vancouver," Washington. Collected by Douglas.

Range. British Columbia to Oregon west of the Cascade Mountains.

Specimens examined: Chambers Lake, *Henderson*, August 23, 1892; between Union City and Shelton, *Piper* in 1890, Segualiche Lake, *Piper* in 1887; Fort Vancouver, *Tolmie*; Ilwaco, *Henderson*, September 9, 1892; without locality, *Vasey* in 1889.

Zonal distribution. Humid Transition.

4. **Gentiana oregana** Engelm.; A. Gray, Syn. Fl. 2^1: 122. 1878.

Gentiana affinis ovata A. Gray, Bot. Cal. **1**: 483. 1876, not *G. ovata* F. G. Dietr. Vollst. Lexik. Gaertn. Nachtr. **3**: 458. 1815–21.

TYPE LOCALITY: " From near San Francisco." Collected by Bolander.

RANGE: British Columbia to Idaho and California.

SPECIMENS EXAMINED: Fish Lake, *Dunn*, August 8, 1900; Pend Oreille River, *Lyall* in 1861; Spokane County, *Suksdorf* 937; Cheney, *Mrs. Susan Tucker* in 1890; Pullman, *Piper* 1623; Blue Mountains, *Piper*, July, 1896; Davis Ranch, Spokane County, *Kreager* 304; Clarks Springs, Spokane County, *Kreager* 564.

ZONAL DISTRIBUTION: Arid Transition.

5. **Gentiana affinis** Griseb. in Hook. Fl. Bor. Am. **2**: 56. 1838.

TYPE LOCALITY: "Carlton House to Edmonton House." Collected by Drummond.

RANGE: British Columbia to Minnesota, south to California and New Mexico.

SPECIMENS EXAMINED: Parrotts Post-office, *Hull* 552; Spokane County, *Suksdorf* 938; Mission, *Kreager* 489.

ZONAL DISTRIBUTION: Arid Transiton.

"Abundant in mountain valleys, between Spokane and Kettle Falls, in alluvial deposits." Douglas, according to Hooker.

GENTIANA DOUGLASIANA PATENS Griseb. in Hook. Fl. Bor. Am. **2**: 60. 1838. Near Fort Vancouver, *Garry*, according to Hooker. If the plant really occurs in Washington it has not at any rate been seen since. It has been collected at Port Renfrew, Vancouver Island, by Rosendahl & Brand.

FRASERA.

Plants 1 to 2 meters tall; leaves marginless.
  Corolla blue-purple, a single gland on each lobe .... 1. *F. fastigiata.*
  Corolla greenish, two glands on each lobe .... 2. *F. speciosa.*
Plants about ½ meter tall; leaves with firm white margins.
  Whole plant finely pubescent .... 3. *F. albicaulis.*
  Whole plant glabrous .... 4. *F. nitida.*

1. **Frasera fastigiata** (Pursh) Heller, Bull. Torr. Club **24**: 312. 1897.

Swertia fastigiata Pursh, Fl. **1**: 101. 1814.

Frasera thyrsiflora Hook. Kew Journ. Bot. **3**: 288. 1851.

Frasera carolinensis Walt. err. det. Griseb. in Hook. Fl. Bor. Am. **2**: 66. 1838.

TYPE LOCALITY: "On the Missouri Flats near the Rocky Mountains." Collected by Lewis. The Lewis specimen in the herbarium of the Philadelphia Academy of Science is ticketed: "In moist places on the Squamash Flats," that is, Weippe, Idaho. The plant does not occur on the Missouri, Pursh's note being doubtless an error.

RANGE: Northern Idaho and adjacent Washington.

SPECIMENS EXAMINED: Spokane County, *Suksdorf* 939; *Henderson* 2211; Rockford, *Piper*; Palouse, *Henderson*, July 15, 1892; Kamiak Butte, *Elmer* 802; *Piper*, July 20, 1899.

According to Hooker also collected by Douglas, in "mountain valleys, Spokane and Kettle Falls."

ZONAL DISTRIBUTION: Arid Transition and Canadian.

This species is really an inhabitant of rather dry pine woods. At "Quamash Flats" the plant occurs only at the very margins of the moist meadows, but it is abundant in the pine woods adjoining.

2. **Frasera speciosa** Dougl.; Griseb. in Hook. Fl. Bor. Am. **2**: 66, *t. 153*. 1838.

TYPE LOCALITY: "On the low hills near Spokan and Salmon Rivers and subalpine parts of the Blue Mountains, near the Kooskooka River." Collected by Douglas.

RANGE: East Washington to Wyoming, south to California and New Mexico.

SPECIMENS EXAMINED: Upper Naches River, *Henderson*, June, 1892.

3. **Frasera albicaulis** Griseb. in Hook. Fl. Bor. Am. **2**: 67. 1838.

Type locality: "In the mountain vallies between Spokan and Kettle Falls," Washington. Collected by Douglas.

Range: Eastern Oregon and eastern Washington to western Montana.

Specimens examined: Ellensburg, *Piper* 2695; between Coulee City and Waterville, *Spillman*, May, 1896; Ritzville, *Sandberg & Leiberg* 186; Sprague, *Sandberg & Leiberg*, June, 1893; *Henderson*, July 9, 1892; Spokane, *Piper*, June 25, 1897; *Henderson*, May 30, 1892; Spokane County, *Suksdorf* 389; Spangle, *Piper* 3035; Pullman, *Elmer* 823; *Hull*, June, 1892; *Piper* 1619; without locality, *Vasey* 426.

Zonal distribution: Arid Transition.

4. **Frasera nitida** Benth. Pl. Hartw. 322. 1849.

Type locality: "In montibus Sacramento," California. Collected by Hartweg.

Range: California to Klickitat County, Washington.

Specimens examined: Klickitat County, *Suksdorf* 40; Klickitat River, *Flett* 1023.

Zonal distribution: Arid Transition.

MENYANTHACEAE.

Leaves trifoliolate; corolla lobes fimbriate .... MENYANTHES.
Leaves simple, reniform; corolla lobes entire .... NEPHROPHYLLIDIUM.

MENYANTHES.

1. **Menyanthes trifoliata** L. Sp. Pl. **1**: 145. 1753. Buck bean.

Type locality: Europe.

Range: Alaska to Greenland, south to Pennsylvania, Minnesota, and California.

Specimens examined: Whidby Island, *Gardner* 203; Seattle, *Piper* in 1888; Tacoma, *Flett* 33; Cascade Mountains, latitude 49°, *Lyall* in 1859; Davis Lake, *Kreager*, August 9, 1902; Rock Lake, *Lake & Hull*, August 3, 1892; Olympia, *Henderson*, May 24, 1892; Hangman Creek, *Sandberg & Leiberg* 39.

Zonal distribution: Transition.

NEPHROPHYLLIDIUM.

1. **Nephrophyllidium crista-galli** (Menzies) Gilg in Engler & Prantl, Nat. Pflanzenfam. 4^2: 106. 1895. Deer cabbage.

Menyanthes crista-galli Menzies; Hook. Bot. Misc. **1**: 45. *pl. 24.* 1830.

Type locality: "In marshy pastures in Prince William's Sound," Alaska.

Range: Alaska to Washington near the coast.

Specimens examined: Wreck Creek Prairie, south of Granville, *Conard* 360.

Zonal distribution: Canadian and Hudsonian.

APOCYNACEAE.

APOCYNUM.

Corolla lobes spreading or recurved; leaves ovate.
  Leaves glabrous.
    Tall; leaves ovate or oval .... 1. *A. androsaemifolium.*
    Low; leaves orbicular-ovate .... 1a. *A. androsaemifolium pumilum.*
  Leaves puberulent, orbicular-ovate .... 1b. *A. androsaemifolium detonsum.*
Corolla lobes erect; leaves oval or oblong.
  Calyx and bracts ciliolate .... 2. *A. ciliolatum.*
  Calyx and bracts entire.
    Cymes large, many-flowered .... 3. *A. cannabinum.*
    Cymes small, few-flowered .... 4. *A. suksdorfii.*

1. **Apocynum androsaemifolium** L. Sp. Pl. 1: 213. 1753.

TYPE LOCALITY: "In Virginia, Canada."

RANGE: British Columbia to Nova Scotia, south to Arizona and Georgia.

SPECIMENS EXAMINED: Seattle, *Piper* in 1897; Lake Chelan, *Lake & Hull* 550; Wenache, *Whited* 1423.

ZONAL DISTRIBUTION: Transition.

1a. **Apocynum androsaemifolium pumilum** A. Gray, Syn. Fl. 2¹: 83. 1878.

TYPE LOCALITY: "California to British Columbia."

SPECIMENS EXAMINED: Pullman, *Piper* 1620, 3508; *Hull* in 1892; Peshastin, *Sandberg & Leiberg* 475; Falcon Valley, *Suksdorf* in 1886; Loon Lake, *Winston*, July 20, 1899; Clarks Springs, *Kreager* 89; North Yakima, *Mrs. Steinweg;* without locality, *Wilkes Expedition* 422; Clealum Lake, *Cotton* 858.

RANGE: British Columbia and Idaho to California.

ZONAL DISTRIBUTION: Arid Transition.

1b. **Apocynum androsaemifolium detonsum** subsp. nov.

Like the preceding, but the whole plant clothed with a short dense pubescence. Type specimen collected in eastern Washington by G. R. Vasey (no. 429) in 1889.

2. **Apocynum ciliolatum** sp. nov.

Stems erect, very leafy, branched above, 60 to 70 cm. high, glabrous; leaves elliptic or elliptic-lanceolate, puberulent on both sides, 4 to 7 cm. long, 2 to 3 cm. wide, nearly sessile; panicle ample, rather loose, its branches erect, glabrous; bracts lanceolate, ciliate; pedicels pubescent; calyx lobes deltoid, acute, erect, ciliolate, shorter than the corolla tube; corolla pink, 5 mm. long, the erect lanceolate acutish ciliolate lobes as long as the tube, which is nearly glabrous within.

Collected at Wawawai, Washington, July 17, 1892, *Lake & Hull*, no. 549.

A near ally of *A. cannabinum* L., but distinct from any described species in its ciliolate calyx and corolla.

3. **Apocynum cannabinum** L. Sp. Pl. 1: 213. 1753. INDIAN HEMP.

TYPE LOCALITY: "In Canada, Virginia."

RANGE: British Columbia to Nova Scotia south to Florida and California.

SPECIMENS EXAMINED: North Yakima, *Watt*, August, 1895; Peshastin, *Sandberg & Leiberg* 591; without locality, *Vasey* in 1889.

ZONAL DISTRIBUTION: Arid Transition and Upper Sonoran.

4. **Apocynum suksdorfii** Greene, Pittonia 5: 65. 1902.

? *Apocynum cannabinum glaberrimum* A. DC. Prod. 8: 439. 1844.

TYPE LOCALITY: "Sandy banks of the Columbia River." Collected by Suksdorf.

RANGE: Eastern Washington and Eastern Oregon.

SPECIMENS EXAMINED: Wenache, *Whited*; west Klickitat County, *Suksdorf* 1522; Ophir, *Elmer* 507; Wawawai, *Piper* 1621 and August 24, 1894; Columbia Valley, *Lyall* in 1860: Waitsburg, *Horner* 335B.

ZONAL DISTRIBUTION: Arid Transition and Upper Sonoran.

ASCLEPIADACEAE.

ASCLEPIAS. MILKWEED.

Leaves linear or lanceolate, glabrous; follicles smooth.................... 2. *A. mexicana.*
Leaves oval or oblong, white-tomentose; follicles warty................. 1. *A. speciosa.*

1. **Asclepias speciosa** Torr. Ann. Lyc. N. Y. 2: 218. 1823.

TYPE LOCALITY: "On the Canadian?" Collected by James.

RANGE: Washington to California and Arkansas.

Specimens examined: Columbia River, latitude 46° to 49°, *Lyall* in 1860; Egbert Springs, *Sandberg & Leiberg* 379; without locality, *Vasey* 428; Wenache, *Whited* 68; Ellensburg, *Whited* 489; North Yakima, *Watt*, August, 1895; Union Flat, *Lake & Hull* 555; Waitsburg, *Horner* 404; Almota, *Piper* 1868; Pullman, *Elmer* 899; *Piper* 1625; Mission, *Kreager*, August 20, 1902.

Zonal distribution: Upper Sonoran and Arid Transition.

2. **Asclepias mexicana** Cav. Ic. **1**: 42. 1791.

Asclepias fascicularis Dec. in DC. Prod. **8**: 569. 1844.

Type locality: "Habitat prope Mexico."

Range: Washington to California, Arizona, and Mexico.

Specimens examined: Tampico, *Flett* 1025; Fort Simcoe, *Henderson*; Spokane, *Sandberg*, August, 1892; *Dewart*, July 15, 1901; Wawawai, *Piper* 2664; *Horner* 664.

Zonal distribution: Upper Sonoran and Arid Transition.

CONVOLVULACEAE.

CONVOLVULUS. Morning-glory.

Calyx without bracts; leaves glabrous........................ 3. *C. arvensis.*
Calyx inclosed by two large bracts.
  Leaves reniform, fleshy.................................. 1. *C. soldanella.*
  Leaves triangular-sagittate, not fleshy.................... 2. *C. sepium americanus.*

1. **Convolvulus soldanella** L. Sp. Pl. **1**: 159. 1753.

Type locality: "Habitat in Angliae, Frisiae littoribus maris."

Range: Washington to California on the seashore. Europe.

Specimens examined: Whidby Island, *Gardner* 219; Copalis, *Lamb* 1257; Shoalwater Bay, *Cooper*; Ocosta, *Henderson* in 1892; Ilwaco, *Piper* 4999.

Zonal distribution: Humid Transition.

2. **Convolvulus sepium americanus** Sims, Bot. Mag. **19**: *pl.* 732. 1804.

Type locality: America.

Range: Washington to Canada and Carolina.

Specimens examined: Mount Adams, *Suksdorf*, July 14, 1886; *Henderson*; Klickitat River, *Flett* 1022; Ophir, *Elmer* 607; Almota, *Piper*, August 9, 1896; Wawawai, *Piper* 1694.

Zonal distribution: Upper Sonoran and Arid Transition.

3. **Convolvulus arvensis** L. Sp. Pl. **1**: 153. 1753.

Type locality: Europe.

Specimens examined: Ellensburg, *Whited* 525. A troublesome weed becoming widespread. It has been noted at Pullman, Walla Walla, Garfield, and Edwall.

CUSCUTACEAE.

CUSCUTA. Dodder.

Stigmas filiform; corolla scales crenulate.
  Calyx lobes not keeled; corolla lobes triangular, acute.. 1. *C. epithymum.*
  Calyx lobes keeled; corolla lobes ovate, obtuse......... 2. *C. planiflora.*
Stigmas capitate; corolla scales fringed.
  Capsule pointed.
    Flowers subsessile; dry corolla not enveloping the capsule....................................... 3. *C. squamigera.*
    Flowers pedicelled; dry corolla enveloping the capsule.. 4. *C. indecora.*

Capsule globose.
Flowers sessile; style shorter than the ovary........ 5. *C. arvensis.*
Flowers pedicelled.
Stems coarse: calyx lobes obtuse.............. 6. *C. cephalanthi.*
Stems fine; calyx lobes acute.................. 7. *C. californica.*

1. **Cuscuta epithymum** Murr.; L. Syst. ed. 13; 140. 1774.

TYPE LOCALITY: None given, but European.

SPECIMENS EXAMINED: Vashon Island, *Gardner* 210; Seattle, *Piper.*

2. **Cuscuta planiflora** Tenore, Fl. Nap. **3**: 250. 1824–29.

TYPE LOCALITY: Near Naples, Italy.

RANGE: Introduced in the western United States.

SPECIMENS EXAMINED: Entiat, Mr. Grover in 1898.

That this species is perfectly distinct from *C. epithymum* has clearly been demonstrated by the studies of Mr. F. H. Hillman.

3. **Cuscuta squamigera** (Engelm.).

Cuscuta californica squamigera Engelm. Trans. St. L. Acad. **1**: 499. 1859.

Cuscuta subinclusa abbreviata Engelm. op. cit. 500. 1859.

Cuscuta salina Engelm. in A. Gray, Bot. Cal. **1**: 536. 1876.

TYPE LOCALITY: "Saline soil in the Rio Virgen, Utah, on Suaeda."

RANGE: British Columbia to California and Arizona.

SPECIMENS EXAMINED: Port Angeles, *Piper,* September 1, 1895; Port Ludlow, *Binns;* Coupeville, *Gardner* 218; Seattle, *Piper* in 1889; Shelton, *Piper,* August 10, 1899; Tacoma, *Flett* 77.

In Cooper's report this species was called *C. umbrosa* Beyrich.

ZONAL DISTRIBUTION: Humid Transition.

4. **Cuscuta indecora** Choisy, Mem. Soc. Phys. Geneva **9**: 278. 1841.

TYPE LOCALITY: "Hab. Mexicam ad Matamoras."

RANGE: Washington to California, eastward to Illinois and Florida.

SPECIMENS EXAMINED: Waitsburg, *Horner,* October 5, 1893, on alfalfa and prickly lettuce.

5. **Cuscuta arvensis** Beyrich; Hook. Fl. Bor. Am. **2**: 77. 1838.

TYPE LOCALITY: "N. W. America." Collected by Douglas.

RANGE: Washington to New York, southward to California and Florida.

SPECIMENS EXAMINED: Waitsburg, *Horner,* on alfalfa, October 5, 1893.

5a. **Cuscuta arvensis calycina** Engelm. Trans. St. Louis Acad. **1**: 495. 1859.

TYPE LOCALITY: Texas.

In the original description Engelmann includes Geyer's no. 674, collected at the "mouth of the Walla Walla River, on the muddy borders, infesting the stems of *Xanthium microcarpon,* September." We have not seen this specimen nor do we know the plant.

6. **Cuscuta cephalanthi** Engelm. Am. Journ. Sci. **43**: 336. 1842.

Cuscuta tenuiflora Engelm.; A. Gray, Man. 350. 1848.

TYPE LOCALITY: "Near St. Louis," Missouri.

RANGE: Washington to Saskatchewan, southward to Arizona, Texas, and Pennsylvania.

SPECIMENS EXAMINED: Ophir, *Elmer;* North Yakima, *Piper* 1796; Snohomish County, *Gardner* 217; Waitsburg, *Horner* 569.

ZONAL DISTRIBUTION: Transition.

7. **Cuscuta californica** Choisy, Mem. Soc. Phys. Geneva **9**: 279. 1841.

TYPE LOCALITY: "Hab. nov. California." Collected by Douglas.

RANGE: Washington to California.

SPECIMENS EXAMINED: Skamania County, *Suksdorf* 1487; Peshastin, *Sandberg & Leiberg* 495; Spokane, *Henderson* 2273; Blue Mountains, *Piper* 2448.

ZONAL DISTRIBUTION: Arid Transition.

POLEMONIACEAE. PHLOX FAMILY.

Calyx distended and at length burst by the capsule.
Corolla large, salverform; leaves all opposite, entire; seeds not becoming mucilaginous when wetted; ours all suffruticose perennials .... PHLOX (p. 456).
Corolla tubular, funnelform or salverform, usually small; leaves mostly alternate, usually not entire .... GILIA (p. 459).
Calyx not distended nor burst by the capsule.
Corolla not rotate.
Calyx lobes spine-tipped; leaves pinnatifid .... NAVARRETIA (p. 463).
Calyx lobes not spine-tipped; leaves entire or pinnatifid. COLLOMIA (p. 464).
Corolla rotate (in ours); leaves pinnate, the leaflets entire.... POLEMONIUM (p. 466).

PHLOX.

Densely tufted species with crowded leaves; flowers solitary on the shoots.
Herbage beset with woolly hairs .... 1. *P. canescens.*
Herbage not beset with woolly hairs.
Calyx not at all wooly; leaves hispid-ciliate.
Leaves grooved, 5 to 6 mm. long .... 2. *P. condensata.*
Leaves usually plane, 8 to 14 mm. long .... 3. *P. caespitosa.*
Calyx sparsely woolly; leaves often woolly at base.
Herbage finely glandular .... 4. *P. rigida.*
Herbage not glandular.
Leaves all acerose; style half as long as corolla ...... 5. *P. douglasii.*
Leaves not all acerose; style nearly as long as corolla .... 6. *P. diffusa.*
Loosely tufted taller species; flowers in cymes.
Style long, usually equaling the corolla tube.
Inflorescence not glandular; leaves narrowly linear .... 7. *P. longifolia.*
Inflorescence glandular.
Whole plant viscid-pubescent; leaves linear, 2 to 4 mm. wide .... 8. *P. viscida.*
Only the inflorescence viscid-pubescent; leaves linear, 1 mm. wide .... 9. *P. viridis.*
Style short, not longer than the ovary.
Upper leaves on flowering stem dilated at base.
Leaves linear, soft; cymes loose .... 10. *P. speciosa.*
Leaves lanceolate, rigid; cymes dense .... 11. *P. lanceolata.*
Upper leaves on flowering stems not dilated at base.
Leaves linear or narrowly lanceolate .... 12. *P. whitedii.*
Leaves broader, lanceolate .... 13. *P. occidentalis.*

1. Phlox canescens Torr. & Gr. Pac. R. Rep. 2^2: 122, *pl. 6.* 1855.

TYPE LOCALITY: "On the Cedar Mountains, south of Great Salt Lake," Utah.

RANGE: Eastern Washington to California and Colorado.

SPECIMENS EXAMINED: Wenas, *Cotton* 917; Horse Heaven, *Cotton* 589; Rattlesnake Mountains, *Cotton* 566; Klickitat Hills, *Gorman*, April, 1895; Columbus, *Suksdorf*, April 13, 1896.

ZONAL DISTRIBUTION: Arid Transition.

2. **Phlox condensata** (A. Gray) E. Nelson, Rev. West. N. A. Phloxes 13. 1899.

Phlox caespitosa condensata A. Gray, Proc. Am. Acad. **8**: 254. 1870.

Phlox condensata hendersoni E. Nelson, loc. cit. 14.

TYPE LOCALITY: "From the headwaters of Clear Creek, and the alpine ridges lying east of Middle Park," Colorado. Collected by Parry.

RANGE: Washington, Oregon, and Colorado.

SPECIMENS EXAMINED: Olympic Mountains, *Flett* 817; *J. M. Grant* 4; Mount Stuart, *Brandegee* 958; Mount Adams, *Henderson*, August 10, 1892; (type of subspecies *hendersoni* E. Nelson); *Suksdorf* 390; *Howell* in 1882; *Flett* 1245.

ZONAL DISTRIBUTION: Arctic.

3. **Phlox caespitosa** Nutt. Journ. Acad. Phila. **7**: 41. 1834.

TYPE LOCALITY: "Flat-Head River on the sides of dry hills." Collected by Wyeth.

RANGE: Washington and Montana, southward to New Mexico.

SPECIMENS EXAMINED: Without locality, *Brandegee* in 1883.

4. **Phlox rigida** Benth. in DC. Prod. **9**: 306. 1845.

Phlox piperi E. Nelson, Rev. West. N. A. Phloxes 18. 1899.

TYPE LOCALITY: "In montibus coeruleis Americae boreali-occid." Collected by Douglas in the Blue Mountains of Oregon.

RANGE: Eastern Washington, eastern Oregon, and adjacent Idaho.

SPECIMENS EXAMINED: Spokane, *Piper* 2286, 2946; *Henderson* 2412; Spokane Valley, *Lyall*, May, 1861; Hangman Creek, *Sandberg & Leiberg* 37; junction Crab and Wilson creeks, *Sandberg & Leiberg* 274; without locality, *Vasey* 392; Spokane, *Kreager* 164; Mount Carlton, *Kreager* 243; Chelan Butte, *Cotton* 596.

ZONAL DISTRIBUTION: Arid Transition.

5. **Phlox douglasii** Hook. Fl. Bor. Am. **2**: 73. 1838.

TYPE LOCALITY: "N. W. America: common on the Limestone range of the Blue Mountains [Oregon], and on the Rocky Mountains, near the confines of snow." Collected by Douglas.

RANGE: Washington and Idaho to Nevada and California.

SPECIMENS EXAMINED: Cascade Mountains, Yakima County, *Mrs. Steinweg;* Klickitat County, *Suksdorf* 11; also April 22, 1881.

ZONAL DISTRIBUTION: Hudsonian.

6. **Phlox diffusa** Benth. Pl. Hartw. 325. 1849.

Phlox douglasii diffusa A. Gray, Proc. Am. Acad. **8**: 254. 1870.

TYPE LOCALITY: "Prope Bear Valley in montibus Sacramento," California. Collected by Hartweg.

RANGE: British Columbia, Washington, Idaho, and Oregon.

SPECIMENS EXAMINED: Olympic Mountains, *Piper; Henderson;* Nason Creek, *Sandberg & Leiberg* 660; Mount Rainier, *Allen* 265; *Piper* 2132; Mount Stuart, *Elmer* 1108; Mount Adams, *Henderson;* Cascade Mountains, latitude 49°, *Lyall;* Horseshoe Basin, *Lake & Hull* 595; Skamania County, *Suksdorf;* Klickitat River, *Flett* 1246; without locality, *Brandegee* 960; Olympic Mountains, *Elmer* 2820.

ZONAL DISTRIBUTION: Arctic.

7. **Phlox longifolia** Nutt. Journ. Acad. Phila. **7**: 41. 1834.

Phlox speciosa linearifolia Hook. Journ. Bot. **3**: 289. 1851.

Phlox speciosa latifolia Hook. loc. cit.

Phlox linearifolia A. Gray, Syn. Fl. **2**^{1}: 133. 1878.

Phlox humilis Dougl.; Benth. in DC. Prod. **9**: 306. 1845.

TYPE LOCALITY: "Valleys of the Rocky Mountains generally." Collected by Wyeth.

RANGE: Washington to Montana and Colorado.

Specimens examined: Wenache Mountains, *Whited* 39; Wenache, *Whited* 9, 1037; North Yakima, *Mrs. Steinweg; Piper,* April 22, 1898; *Henderson* 2415; Pasco, *Hindshaw* 19; *Piper* 2959; Spangle, *Piper,* June 24, 1899; Sprague, *Henderson;* Spokane, *Piper,* May 19, 1899; Rockland, *Suksdorf,* April 10, 1886; Columbus, *Suksdorf,* April 14, 1886; Columbia Plains, *Douglas* in 1886 (type of *Phlox humilis*); Hangman Creek, *Sandberg & Leiberg* 62; Almota, *Piper,* May 27, 1893; Wawawai, *Piper* 1513, 3009; *Lake* 594; Waitsburg, *Horner* 159; Pataha, *Hull* 594; without locality, *Brandegee* 961; without locality, *Vasey* 397, 399.

Zonal distribution: Arid Transition and Upper Sonoran.

8. **Phlox viscida** E. Nelson, Rev. West. N. A. Phloxes 24. 1899.

Type locality: "Blue Mts., Columbia Co.," Washington. Collected by Piper.

Range: Washington to California.

Specimens examined: Blue Mountains, *Piper* 2397; *Horner* 137; Klickitat Hills, *Gorman,* April, 1895; Wenas Creek, *Cotton* 1152; Klickitat Valley, *Howell* 1380.

Zonal distribution: Arid Transition.

9. **Phlox viridis** E. Nelson, Rev. West. N. A. Phloxes 24. 1899.

Type locality: "Ellensburg, Washington." Collected by Piper.

Range: Eastern Washington and Idaho.

Specimens examined: Wenache, *Whited* 628; Ellensburg, *Piper* 2689.

Zonal distribution: Arid Transition.

10. **Phlox speciosa** Pursh, Fl. **1**: 149. 1814.

Type locality: "On the plains of the Columbia." Collected by Lewis. The exact place is probably on the Clearwater below Kamiah, Idaho.

Range: Eastern Washington and adjacent Idaho.

Specimens examined: Spokane, *Sandberg & Leiberg* in 1893; Hangman Creek, *Sandberg & Leiberg* 75; Pullman, *Piper* 1894; *Elmer* 839; Almota Canyon, *Piper;* Union Flat, *Piper* 3008; without locality, *Vasey* 401.

Zonal distribution: Arid Transition and Upper Sonoran.

10a. **Phlox speciosa elatior** Hook. Fl. Bor. Am. **2**: 72. 1838.

Phlox sabini Dougl.; Hook. loc. cit. as synonym.

Phlox speciosa sabini A. Gray, Proc. Am. Acad. **8**: 256. 1870.

Type locality: "Limestone Rocks of the Blue Mountains." Collected by Douglas.

Range: Washington, Oregon, and Idaho.

Specimens examined: Spokane, *Lyall* in 1861; Spokane River, *Douglas;* Pullman, *Hull,* May 24, 1892; Union Flat, *Piper* 2008.

Zonal distribution: Arid Transition.

11. **Phlox lanceolata** E. Nelson, Rev. West. N. A. Phloxes 29. 1899.

Type locality: "Ellensburg, Wash." Collected by Piper.

Range: Central Washington.

Specimens examined: Ellensburg, *Piper,* May 20, 1897; Cleman Mountain, *Henderson* 2413; Rock Island, *Sandberg & Leiberg* 443.

Zonal distribution: Arid Transition and Upper Sonoran.

12. **Phlox whitedii** E. Nelson, Erythea **7**: 167. 1899.

Type locality: Wenache, Washington. Collected by Whited.

Range: Central Washington.

Specimens examined: Wenache, *Whited* 1036; Cascade Mountains, Yakima County, *Mrs. Steinweg;* Rattlesnake Mountains, *Cotton* 573.

Zonal distribution: Arid Transition.

13. **Phlox occidentalis** Durand, Pac. R. Rep. **4**: 125. 1856.

Type locality: "Hillsides, near Duffield's Ranch," California.

RANGE: Washington to California.

SPECIMENS EXAMINED: Wenache, *Whited* 1069; Kittitas Valley, *Lyall*, June 1860; west Klickitat County, *Suksdorf*, May 18, 1886 and 2208; Chelan Butte, *Griffiths & Cotton* 184; Umtanum Ridge, *Cotton* 918.

ZONAL DISTRIBUTION: Arid Transition.

GILIA.

- Shrubs; corolla salverform, yellow; leaves acerose.
  - Leaves straight .... 1*a*. *G. pungens hookeri.*
  - Leaves recurved .... 1*b*. *G. pungens squarrosa.*
- Herbs.
  - Perennials or biennials.
    - Flowers in an elongate panicle; corolla large, tubular-funnelform, usually scarlet .... 10. *G. aggregata.*
    - Flowers in corymbs or heads, rather small, white or whitish.
      - Leaves palmately 3 to 7-parted; flowers in corymbs .... 8. *G. nuttallii.*
      - Leaves pinnately 3 to 9-divided; flowers in heads.. 9. *G. congesta.*
  - Annuals.
    - Leaves or some of them opposite.
      - Lower leaves dissected like the upper, into filiform segments, all opposite.
        - Flowers in a capitate leafy cluster; corolla 10 to 12 mm. long .... 2. *G. bicolor.*
        - Flowers scattered, on slender pedicels.
          - Corolla almost rotate, 8 to 10 mm. broad .... 3. *G. pharnaceoides.*
          - Corolla tubular-funnelform.
            - Ovules solitary in each cell, corolla whitish, 3 mm. long .... 4. *G. harknessii.*
            - Ovules 2 to 5 in each cell, corolla purplish, 12 mm. long .... 5. *G. bolanderi.*
      - Lower leaves opposite, the upper alternate, both entire.
        - Stems simple below; flowers 8 to 10 mm. long .... 6. *G. gracilis.*
        - Stems branched from the base; flowers 5 to 7 mm. long .... 7. *G. humilis.*
    - Leaves all alternate.
      - Herbage woolly; flowers pale blue, clustered...... 11. *G. filifolia.*
      - Herbage not woolly.
        - Leaves not in a basal rosette.
          - Flowers blue, in dense globose clusters on long naked peduncles; leaves dissected into filiform segments.
            - Calyx glabrous; corolla 8 to 10 mm. long .... 12 *G. capitata.*
            - Calyx woolly; corolla 10 to 12 mm. long .... 13. *G. achilleaefolia.*
          - Flowers scattered; leaves filiform, mostly entire.
            - Branches elongate, erect; corolla blue; pedicels short .... 14. *G. minutiflora.*

Branches divergent, not elongate;
corolla pink; pedicels slender..... 15. *G. capillaris.*
Leaves mostly in a basal rosette.
Radical leaves dentate, not pubescent... 16. *G. leptomeria.*
Radical leaves pinnatifid, pubescent .... 17. *G. inconspicua.*

1a. Gilia pungens hookeri A. Gray, Proc. Am. Acad. **8**: 268. 1870.

Phlox hookeri Dougl.; Hook. Fl. Bor. Am. **2**: 73. *t. 159.* 1838.

Gilia hookeri Benth. in DC. Prod. **9**: 316. 1845.

Type locality: "Common on arid, sandy, and rocky soils near the narrows of the Oakanagan and Priest's Rapids of the Columbia," Washington. Collected by Douglas.

Range: British Columbia to Oregon east of the Cascade Mountains.

Specimens examined: North Yakima, *Flett* 1031; Yakima Region, *Brandegee* 965; near Morgans Ferry, *Suksdorf* 392; Spokane, *Spalding;* Soap Lake, *McKay* 7; Ritzville, *Sandberg & Leiberg* 181; without locality, *Vasey* 394; near Spokane, *Kreager* 168; Chelan, *Elmer* 502; Methow River, *Whited* 236; Yakima, *Leckenby*, May 11, 1898; Coulee City, *Lake & Hull* 669; North Yakima, *Henderson*, May 27, 1892; Chelan Butte, *Cotton* 594; Coulee City, *Cotton* 606.

Zonal distribution: Upper Sonoran.

1b. Gilia pungens squarrosa A. Gray, Proc. Am. Acad. **8**: 268. 1870.

Type locality: "Near Carson City," Nevada. Collected by Anderson.

Range: Eastern Washington to Idaho and Nevada.

Specimens examined: Columbia River, latitude 46° to 49°, *Lyall* (very viscid-pubescent).

2. Gilia bicolor (Nutt.).

Leptosiphon bicolor Nutt. Journ. Acad. Phila. n. ser. **1**: 156. 1847.

Linanthus bicolor Greene, Pittonia **2**: 260. 1892.

Gilia tenella Benth. Pl. Hartw. 325. 1849.

Type locality: "On moist rocks of the Oregon near the outlet of the Wahlamet." Collected by Nuttall.

Range: Vancouver Island to California.

Specimens examined: Whidby Island, *Gardner* 207; Admiralty Head, *Piper*, May, 1898; Fidalgo Island, *Flett* 2105; Montesano, *Henderson* 2409; *Heller* 4012; Tacoma, *Flett*, May 31, 1896; Olympia, *Henderson* 2410; Steilacoom, *Suckley;* Klickitat County, *Suksdorf* 43; Clallam County, *Elmer* 2823.

Zonal distribution: Humid Transition.

3. Gilia pharnaceoides Benth. Bot. Reg. **19**: under *pl. 1622.* 1833.

Linanthus pharnaceoides Greene, Pittonia **2**: 254. 1892.

Type locality: "California." Collected by Douglas.

Range: British Columbia to California, eastward to the Rocky Mountains.

Specimens examined: Pasco, *Piper*, May 26, 1899; Cascade Mountains to Colville, *Lyall* in 1860; Wilbur, *Henderson*, July, 1892; Wilson Creek, *Sandberg & Leiberg*, June, 1893; Coulee City, *Lake & Hull* 585; Chelan, *Elmer* 499; Spokane County, *Suksdorf* 391; *Piper*, July 18, 1894; *Henderson*, May 31, 1892; Chimokane Valley, *Geyer* 535; Walla Walla, *Spalding;* junction Crab and Wilson creeks, *Sandberg & Leiberg* 283; Rattlesnake Mountains, *Cotton* 473; Clarks Springs, *Kreager* 13.

"Sandy soils at Oakanagunea and Wallawallah," Douglas, according to Hooker.

Zonal distribution: Arid Transition and Upper Sonoran.

4. Gilia harknessii Curran, Bull. Cal. Acad. **1**: 12. 1884.

Linanthus harknessii Greene, Pittonia **2**: 255. 1892.

Type locality: "At the summit of the Sierra Nevada," California. Collected by Harkness.

Range: Idaho and Washington to California.

SPECIMENS EXAMINED: Wenache, *Whited*, June, 1896; Falcon Valley, *Suksdorf* 42, 165; Simcoe Hills, *Howell* 290; Klickitat River, *Flett* 1226; Sprague, *Henderson*, July 10, 1892; Sprague, *Sandberg & Leiberg* 201; Kamiak Butte, *Elmer* 803; Blue Mountains, *Horner* 389; *Piper* 2398.

ZONAL DISTRIBUTION: Arid Transition.

5. **Gilia bolanderi** A. Gray, Proc. Am. Acad. **8**: 263. 1870.

Linanthus bolanderi Greene, Pittonia **2**: 255. 1892.

TYPE LOCALITY: "Sonoma County, California, on dry hills; Russian River." Collected by Bolander.

RANGE: Washington to California.

SPECIMENS EXAMINED: Klickitat County, *Suksdorf* 549; White Salmon, *Suksdorf* 293.

ZONAL DISTRIBUTION: Arid Transition.

6. **Gilia gracilis** (Dougl.) Hook. Bot. Mag. **56**: *pl. 2924*. 1829.

Collomia gracilis Dougl.; Hook. loc. cit. as synonym.

Phlox gracilis Greene, Pittonia **1**: 141. 1887.

Microsteris gracilis Greene, Pittonia **3**: 300. 1898.

Gilia gracilis elatior Suksdorf, Deutsch. Bot. Monatss. **18**: 132. 1900.

Gilia gracilis pratensis Suksdorf, loc. cit.

TYPE LOCALITY: "On the banks of the Spokane River and on high grounds near Flathead River." Collected by Douglas.

RANGE: British Columbia to Nebraska, Colorado, and California.

SPECIMENS EXAMINED: Montesano, *Heller* 3909; Seattle, *Smith* 154; Olympia, *Henderson* 2405, 2406; *Kincaid*, July 4, 1896; upper Nisqually Valley, *Allen* 77; Silverton, *Bouck* 31; Tieton River, *Cotton* 485; Tacoma, *Flett* 196, 881, 882; Falcon Valley, *Suksdorf* 2114, 1508; Ellensburg, *Whited* 268; Pasco, *Hindshaw* 50; Chimokane, *Lyall* in 1860; Fort Vancouver, *Douglas* in 1825; Klickitat River, *Flett* 1229; Rock Creek, *Sandberg & Leiberg* 78; Spokane Valley, *Lyall* in 1861; Spokane, *Piper*, May 23, 1897; Pullman, *Piper* 1517; *Hull* 588; Waitsburg, *Horner*, April 12, 1897; Wawawai, *Piper*, May 19, 1894; *Elmer* 76; Davis Ranch, *Kreager*; Clallam County, *Elmer* 2824; Mount Rainier, *Flett* 2153.

ZONAL DISTRIBUTION: Upper Sonoran and Transition.

7. **Gilia humilis** (Greene).

Microsteris humilis Greene, Pittonia **3**: 301. 1898.

? *Collomia gracilis humilior* Hook. Fl. Bor. Am. **2**: 76. 1838.

Gilia microsteris Piper, Fl. Palouse Reg. 142. 1901.

TYPE LOCALITY: "South end of Lake Pend Oreille," Idaho. Collected by Leiberg.

RANGE: Eastern Washington and adjacent Oregon and Idaho.

SPECIMENS EXAMINED: Wenache, *Whited* 13; Ellensburg, *Piper*, May 20, 1897; *Whited* 268; Skamania County, *Suksdorf* 2314; Falcon Valley, *Suksdorf* 163; Tampico, *Flett* 1030; Rattlesnake Mountains, *Cotton* 308; Spokane, *Piper* 2291; *Henderson* 2404; Hangman Creek, *Sandberg & Leiberg* 25; Spangle, *Piper* 3547; Pullman, *Hull*, April 12, 1892; *Piper* 1518; Coulee City, *Piper* 3851.

ZONAL DISTRIBUTION: Arid Transition.

7a. **Gilia humilis glabella** (Greene).

Microsteris glabella Greene, Pittonia **3**: 301. 1898.

Gilia gracilis glabella Suksdorf, Deutsch. Bot. Monatss. **18**: 132. 1900.

TYPE LOCALITY: Falcon Valley, Washington. Collected by Suksdorf.

RANGE: Washington and Oregon.

SPECIMENS EXAMINED: Falcon Valley, *Suksdorf* 2206.

8. **Gilia nuttallii** A. Gray, Proc. Am. Acad. **8**: 267. 1870.

TYPE LOCALITY: "Rocky Mountains of Colorado and Utah to the Sierra Nevada in California."

RANGE: Washington to Colorado, Arizona, and Southern California.

SPECIMENS EXAMINED: Mount Rainier, *Smith* 882; *Flett* 240; Goat Mountains, *Allen* 119; mountains north of Ellensburg, *Brandegee* 964; Blue Mountains, *Piper* 2419.

ZONAL DISTRIBUTION: Hudsonian and Canadian.

9. **Gilia congesta** Hook. Fl. Bor. Am. **2**: 75. 1838.

TYPE LOCALITY: "Sandy plains of the Columbia." Collected by Douglas.

RANGE: Washington and Wyoming to California and Colorado.

SPECIMENS EXAMINED: Upper Columbia, *Wilkes Expedition* 436.

This specimen has narrow mostly entire leaves, approaching in character *G. congesta crebrifolia*.

10. **Gilia aggregata** (Pursh) Spreng. Syst. **1**: 626. 1825.

Cantua aggregata Pursh, Fl. **1**: 147. 1814.

Gilia pulchella Dougl.; Hook. Fl. Bor. Am. **2**: 74. 1838.

TYPE LOCALITY: "On the banks of the Mississippi, M. Lewis;" but the specimens were really collected on "Hungry Creek" [Lolo Creek], in Western Idaho.

RANGE: Washington to California, Texas, and Nebraska.

SPECIMENS EXAMINED: Wenache, *Whited* 151; North Yakima, *Henderson*, May 29, 1892; *Leckenby*, May, 1898; *Watt*, August, 1895; Tieton River, *Cotton* 441; Fish Lake, *Dunn*, August, 1900; Klickitat River, *Flett* 1221; Peshastin, *Sandberg & Leiberg* 474; eastern Washington, *Wilcox* in 1883; locality unknown, *Vasey* 408; Pullman, *Piper* 1519; Blue Mountains, *Piper*, August 2, 1896; Clarks Springs, *Kreager* 91; Conconully, *Griffiths & Cotton* 313.

ZONAL DISTRIBUTION: Arid Transition and Canadian.

11. **Gilia filifolia** Nutt. Journ. Acad. Phila. n. ser. **1**: 156. 1847.

TYPE LOCALITY: "Near Santa Barbara, Upper California."

RANGE: Eastern Washington to Southern California.

SPECIMENS EXAMINED: Pasco, *Piper*, May 26, 1899; *Elmer* 1059; Moses Coulee, *Lake & Hull* 590; Crab and Wilson Creek, *Sandberg & Leiberg* 246; north of Bickleton, *Suksdorf* 393; Yakima Region, *Brandegee* 966; Moses Lake, *Cotton* 614.

ZONAL DISTRIBUTION: Upper Sonoran.

This species has frequently been mistaken for the closely allied *G. floccosa*.

12. **Gilia capitata** Hook. Bot. Mag. **53**: *pl. 2698*. 1826.

TYPE LOCALITY: "From the northwest coast of America," specifically "in the vicinity of Fort Vancouver," Washington. Collected by Douglas.

RANGE: Washington to California.

SPECIMENS EXAMINED: Port Townsend, *Edwards* 20; Whidby Island, *Gardner* 205; Tacoma, *Flett* 79; Olympia, *Heller* 4040; Skamania County, *Flett* 1224; White Salmon, *Suksdorf* 451; Wawawai, *Piper* 3530; Seattle, *Piper* in 1888; Cape Horn, *Piper* 4908.

ZONAL DISTRIBUTION: Transition.

13. **Gilia achilleaefolia** Benth. Bot. Reg. **19**: under *pl. 1622*. 1833.

TYPE LOCALITY: "California." Collected by Douglas.

RANGE: Washington to California.

SPECIMENS EXAMINED: Whatcom County, *Suksdorf* 1998; Port Ludlow, *Binns*, June 30, 1890; Olympia, *Henderson* 2401.

ZONAL DISTRIBUTION: Humid Transition.

14. **Gilia minutiflora** Benth. in DC. Prod. **9**: 315. 1845.

TYPE LOCALITY: "In America boreali occidentali." Collected by Douglas.

RANGE: Eastern Washington to Oregon and Wyoming.

SPECIMENS EXAMINED: Wenache, *Elmer* 481; *Whited* in 1895; Wenache Flat, *Whited* 1158, 1289; North Yakima, *Watt*, August, 1895; *Piper* 1818; *Henderson* in 1892; Kiona, *Piper* 2755; Pasco, *Piper*, July 11, 1897; Wilson Creek, *Lake & Hull* 670; Crab and Wilson creeks, *Sandberg & Leiberg* 270; locality unknown, *Vasey* 400; north of Bickleton, *Suksdorf* 396; Walla Walla region, *Brandegee* 967; Prosser, *Cotton* 813.

ZONAL DISTRIBUTION: Upper Sonoran.

15. **Gilia capillaris** Kellogg, Proc. Cal. Acad. **5**: 46. 1873.

TYPE LOCALITY: "Cisco, Sierra Nevada Mountains," California.

RANGE: Washington, Idaho, Oregon, and California.

SPECIMENS EXAMINED: Mount Stuart, *Elmer* 1226; Simcoe Mountains, *Suksdorf* 395, 1515.

This species was mistaken by Suksdorf for *G. filiformis* Parry and under that name included in his list.

16. **Gilia leptomeria** A. Gray, Proc. Am. Acad. **8**: 278. 1870.

TYPE LOCALITY: "Mountain valleys of Nevada and Utah." Collected by Watson.

RANGE: Eastern Washington to Nevada.

SPECIMENS EXAMINED: Morgan's Ferry, *Suksdorf* 394; Pasco, *Piper* 2984, 2751; *Hindshaw* 27; mouth of Alder Creek, *Howell* 909; junction Crab and Wilson creeks, *Sandberg & Leiberg* 301; Sunnyside, *Cotton* 315.

ZONAL DISTRIBUTION: Upper Sonoran.

17. **Gilia inconspicua** (Smith) Dougl.; Hook. Bot. Mag. *pl. 2883.* 1829.

Ipomopsis inconspicua Smith, Exot. Fl. **1**: *pl. 14.* 1804.

Cantua parviflora Pursh, Fl. **2**: 730. 1814.

Gilia parviflora Spreng. Syst. Veg. **1**: 626. 1825.

TYPE LOCALITY: Supposed by Smith to be from North America.

RANGE: British Columbia to Texas and California.

SPECIMENS EXAMINED: North Yakima, *Watt*, August, 1895; *Henderson*, May 25, 1892; Pasco, *Piper* 2978; *Hindshaw* 22; junction Crab and Wilson creeks, *Sandberg & Leiberg* 261; Walla Walla, *Lyall* in 1860; Prosser, *Cotton* 591.

ZONAL DISTRIBUTION: Upper Sonoran.

NAVARRETIA.

Leaves simply pinnatifid .... 1. *N. divaricata.*
Leaves bipinnatifid.
Herbage glandular-viscid, malodorous .... 2. *N. squarrosa.*
Herbage not glandular nor malodorous.
Stems glabrate; calyx tube nearly glabrous; ovules 1 to 3 in each cell .... 5. *N. minima.*
Stems not glabrate.
Ovules 3 or 4 in each cell; stems pubescent; calyx tube and base of bracts very villous .... 3. *N. intertexta.*
Ovules solitary in each cell; stems puberulent; calyx tube and bracts sparsely villous .... 4. *N. klickitatensis.*

1. **Navarretia divaricata** (Torr.) Greene, Pittonia **1**: 136. 1887.

Gilia divaricata Torr.; A. Gray, Proc. Am. Acad. **8**: 270. 1870.

TYPE LOCALITY: "Along the foothills of the Sierra Nevada," California.

RANGE: Washington to California.

SPECIMENS EXAMINED: Falcon Valley, *Suksdorf*, July, 1881.

2. **Navarretia squarrosa** (Esch.) Hook. & Arn. Bot. Beech. 368. 1840. SKUNK-WEED.

Gilia squarrosa Hook. & Arn. Bot. Beech. 151. 1833.

Hoitzia squarrosa Esch. Mem. Acad. St. Petersb. **10**: 283. 1826.

Gilia pungens Dougl.; Hook. Bot. Mag. **57**: *pl. 2977.* 1830.

TYPE LOCALITY: "In Novae Californiae arenosis."

RANGE: Washington to California.

SPECIMENS EXAMINED: Whidby Island, *Gardner* 204; Lake Washington, *Suksdorf* 992; Fairhaven, *Suksdorf* 993; Tacoma, *Flett* 909, 199; Touchet River, *Horner* 582; Clallam County, *Elmer* 2818.

ZONAL DISTRIBUTION: Humid Transition.

3. **Navarretia intertexta** (Benth.) Hook. Fl. Bor. Am. **2**: 75. 1838.
Aegochloa intertexta Benth. Bot. Reg. **19**: under *pl. 1622*. 1833.
Gilia intertexta Steud. Nom. ed. 2. **1**: 683. 1840.

TYPE LOCALITY: "California and North West America."

RANGE: British Columbia to California, eastward to the Rocky Mountains.

SPECIMENS EXAMINED: Manor, *Piper*, July 14, 1899; Ellensburg, *Whited* 535; Klickitat County, *Suksdorf* 44; Klickitat River, *Flett* 1222; Spokane, *Henderson*, July 9, 1892; *Sandberg, Heller, & McDougal* 904; *Dewart*; Tukanon River, *Lake & Hull* 591; Pullman, *Piper* 1520; Davis Ranch, *Kreager* 178; Washtucna, *Cotton* 617; Rattlesnake Mountains, *Cotton* 663.

ZONAL DISTRIBUTION: Transition.

4. **Navarretia klickitatensis** Suksdorf, Deutsch. Bot. Monatss. **18**: 133. 1900.
Gilia klickitatensis Piper, Bull. Torr. Club **28**: 43. 1901.

TYPE LOCALITY: Klickitat County, near the mouth of Klickitat River, Washington. Collected by Suksdorf.

RANGE: Washington and Oregon.

SPECIMENS EXAMINED: Klickitat River, *Suksdorf* 991.

5. **Navarretia minima** (Nutt.) A. Gray, Proc. Am. Acad. **8**: 269. 1870.
Gilia minima Nutt. Journ. Acad. Phila. n. ser. **1**: 160. 1847.
Navarretia suksdorfii Howell, Fl. N. W. Am. 457. 1901.

TYPE LOCALITY: "Plains of the Oregon, near Walla Walla." Collected by Nuttall.

RANGE: Washington to Dakota, Colorado, and Nevada.

SPECIMENS EXAMINED: Falcon Valley, *Suksdorf*, July, 1881.

COLLOMIA.

Leaves entire.
Flowers solitary-axillary .... 4. *C. tenella*.
Flowers in clusters.
Corolla salmon-color, 2 to 3 cm. long .... 1. *C. grandiflora*.
Corolla pink, 1 cm. long.
Calyx lobes acute; clusters many-flowered .... 2. *C. linearis*.
Calyx lobes aristate; clusters few-flowered .... 3. *C. aristella*.
Leaves more or less dissected.
Annual; leaves pinnate .... 5. *C. heterophylla*.
Perennial; leaves palmate .... 6. *C. debilis*.

1. **Collomia grandiflora** Dougl.; Lindl. Bot. Reg. **14**: *pl. 1174*, 1828.
Gilia grandiflora A. Gray, Proc. Am. Acad. **17**: 223. 1882.

TYPE LOCALITY: "In the northwest of North America in all the country bordering on the Columbia, as far eastward as the valleys of the Rocky Mts., but not beyond that great dividing ridge." Collected by Douglas.

RANGE: British Columbia to Idaho, Nevada, and California.

SPECIMENS EXAMINED: Seattle, *Piper*, July, 1891; Tieton River, *Cotton* 447; Falcon Valley, *Suksdorf* 162; Sprague, *Sandberg & Leiberg* 157; Blue Mountains, *Lake & Hull* 592; Wawawai, *Elmer* 780; Clarks Springs, *Kreager* 112.

Cotton 702 from the Rattlesnake Mountains and a specimen collected by Vasey in 1889 represent a low spreading plant with broader leaves and bracts, probably a new subspecies.

ZONAL DISTRIBUTION: Upper Sonoran and Transition.

1a. Collomia grandiflora diffusa (Mulford).

Gilia grandiflora diffusa Mulford, Bot. Gaz. **19**:120. 1894.

Type locality: "Foothills about Boise City, Idaho." Collected by Miss Mulford.

Range: Eastern Washington, Eastern Oregon, and Idaho.

Specimens examined: Wenache, *Whited* 1124; Leavenworth, *Whited* 240; North Yakima, *Watt* in 1895; *Mrs. Steinweg* in 1894; Rock Island, *Sandberg & Leiberg* 451; west Klickitat County, *Suksdorf* 161; Loon Lake, *Winston*, July 20, 1897; Colfax, *Hardwick;* Pullman, *Piper* 1514.

Zonal distribution: Upper Sonoran and Arid Transition.

2. Collomia linearis Nutt. Gen. **1**: 126. 1818.

Gilia linearis A. Gray, Proc. Am. Acad. **17**: 223. 1882.

Type locality: "Near the banks of the Missouri about the confluence of Shian River, and in the vicinity of the Arikaree village."

Range: Manitoba to British Columbia, south to Colorado and California.

Specimens examined: Wenache, *Whited* 82, 1045; Toppenish, *Henderson*, May 28, 1892; Klickitat River, *Flett* 1227; White Salmon, *Suksdorf* 446; Tampico, *Flett* 1220; Almota Canyon, *Hull* 671; Wawawai, *Lake* 587; Snake River, *Hunter* 26; Pullman, *Piper* 1515 and July 21, 1893; Clarks Springs, Spokane County, *Kreager* 19; Clallam County, *Elmer* 2822; Conconully, *Griffiths & Cotton* 308; Coulee City, *Piper* 3849.

Zonal distribution: Arid Transition and Upper Sonoran.

3. Collomia aristella (A. Gray) Rydberg, Mem. N. Y. Bot. Gard. **1**: 318. 1900.

Gilia aristella A. Gray, Syn. Fl. ed. 2. **2**^{1}: 408. 1886.

Type locality: "Northern part of California." Collected by Greene.

Range: Washington to California.

Specimens examined: Mount Stuart, *Elmer* 1238; Klickitat River, near Mount Adams, *Suksdorf* 590; *Flett* 1228.

4. Collomia tenella A. Gray, Proc. Am. Acad. **8**: 259. 1870.

Gilia leptotes A. Gray, Proc. Am. Acad. **17**: 223. 1882.

Type locality: "Parley's Peak, Utah." Collected by Watson.

Range: Washington to Nevada and Idaho.

Specimens examined: Egbert Springs, *Sandberg & Leiberg* 350; Wenache, *Whited* 2625.

5. Collomia heterophylla Hook. Bot. Mag. **56**: *pl. 2895.* 1829.

Gilia heterophylla Dougl. Bot. Mag. **56**: under *pl. 2895.* 1829, as synonym.

Type locality: "About Fort Vancouver," Washington. Collected by Douglas.

Range: Vancouver Island to California.

Specimens examined: Silverton, *Bouck* 151; Seattle, *Piper*, July 14, 1895; Tacoma, *Flett* 10; Nisqually Valley, *Allen* 65; Montesano, *Heller* 4057; Port Ludlow, *Binns;* Fidalgo Island, *Lyall;* Fort Vancouver, *Scouler;* Mount Rainier, *Flett* 2120; Charleston, *Piper*, July 21, 1895; without locality, *Cooper;* Clallam County, *Elmer* 2821.

Zonal distribution: Humid Transition.

6. Collomia debilis (S. Wats.) Greene, Pittonia **1**: 127. 1887.

Gilia debilis S. Wats. Am. Nat. **7**: 302. 1873.

Gilia larseni A. Gray, Syn. Fl. **2**^{1}: 146. 1878.

Type locality: "Utah." Collected by Wheeler.

Range: Washington to Montana, California, and Utah.

Specimens examined: Mount Rainier, *Piper* 456; *Flett* 30; Mount Stuart, *Brandegee* 968; Mount Adams, *Suksdorf* 450; *Flett* 1223; *Henderson*, August 9, 1892.

Zonal distribution: Arctic.

POLEMONIUM.

- Annual; corolla white, nearly rotate .... 1. *P. micranthum.*
- Perennials; corolla blue, campanulate.
  - Stems erect, 60 to 90 cm. tall.
    - Leaflets oblong-ovate .... 2. *P. coeruleum.*
    - Leaflets linear .... 3. *P. pectinatum.*
  - Stems low, 5 to 30 cm. high.
    - Densely cespitose, 5 to 10 cm. high.
      - Viscid-glandular throughout; flowers violet with yellow eye .... 4. *P. elegans.*
      - Less viscid, sparsely pilose throughout; flowers white or pale blue .... 5. *P. viscosum pilosum.*
    - Loosely cespitose, 15 to 30 cm. high, scarcely glandular.
      - Leaflets oval or oblong, less than 1 cm. long .... 6. *P. humile.*
      - Leaflets lanceolate, 1 to 1.5 cm. long .... 7. *P. amoenum.*

1. **Polemonium micranthum** Benth. in DC. Prod. **9**: 318. 1845.

Type locality: "Ad flum. Columbia." Collected by Douglas.

Range: British Columbia to California and Nevada.

Specimens examined: Wenache, *Whited* 1025, 20; North Yakima, *Henderson*, May 25, 1892; Sunnyside, *Cotton* 322; Coupeville, *Gardner* 209; Fort Colville, *Lyall* in 1861; Spokane, *Piper*, May 16, 1896; Hangman Creek, *Sandberg & Leiberg* 13; Pullman, *Piper*; *Hull* 589; Wawawai, *Piper* 1521; Walla Walla, *Brandegee* 972.

Zonal distribution: Arid Transition and Upper Sonoran.

2. **Polemonium coeruleum** L. Sp. Pl. **1**: 162. 1753.

Polemonium occidentale Greene, Pittonia **2**: 75. 1890.

Type locality: "Habitat in Europae, Asiae, Americae septentrionalibus.

Range: Alaska to California and Colorado. Europe. Asia.

Specimens examined: Mount Adams, *Henderson*, August 4, 1892; Marshall Junction, *Piper* 2251.

The *P. foliosissimum*? of Suksdorf's list is based on a specimen similar to Piper 2251 and from the same region. The specimens from Mount Adams are not quite identical with those from Marshall Junction, and further material may show them to be distinct.

Professor Greene maintains that the so-called *P. coeruleum* of the Pacific coast differs from the European plant in having horizontal rootstocks. Unfortunately too few of the specimens have the underground parts preserved to judge this character fairly.

3. **Polemonium pectinatum** Greene, Bull. Cal. Acad. **1**: 10. 1884.

Type locality: "In the eastern part of Washington Territory." Collected by Hilgard.

Range: Eastern Washington.

Specimens examined: Rock Lake, *Sandberg & Leiberg* 105; Spokane County, *Mrs. Susan Tucker* in 1892; eastern Washington, *Hilgard* in 1882; without locality, *Wilkes Expedition.*

4. **Polemonium elegans** Greene, Pittonia **3**: 305. 1898 (April 8).

Polemonium bicolor Greenman, Bot. Gaz. **25**: 262. 1898 (April 15).

Type locality: "In volcanic sand at 9000 feet altitude on Mt. Rainier, Washington." Collected by Piper.

Range: Cascade Mountains, Washington.

Specimens examined: Mount Rainier, *Piper* 2129; *Smith* 780; *Allen* 62, 294; Mount Adams, *Suksdorf* 79; *Howell* in 1882; *Henderson* 2411; *Flett* 1243.

Zonal distribution: Arctic.

5. **Polemonium viscosum pilosum** Greenman, Bot. Gaz. **25**: 263. 1898

Type locality: "In clefts of rock on Goat Mountain, Washington, altitude 1540 m." Collected by Allen.

Range: Known only from the type locality.

Specimens examined: Goat Mountain near Mount Rainier, *Allen* 261.

6. **Polemonium humile** Roem. & Schult. Syst. **4**: 792. 1819.

Polemonium pulchellum Bunge; Ledeb. Fl. Alt. **1**: 233. 1829.

Polemonium humile pulchellum A. Gray, Syn. Fl. 1²: 150. 1884.

Type locality: "In Siberiae orientalis maritimis arenosis."

Range: Alaska to California and Colorado. Siberia.

Specimens examined: Nason Creek, *Sandberg & Leiberg* 680; Wenache Mountains, *Whited*, August 13, 1896; *Elmer* 456; Wenache Region, *Brandegee* 970; Mount Rainier, *Piper* 2107; *Allen* 262; *Smith* 779; Klickitat River, *Flett* 1244; Cascade Mountains to Colville, latitude 49°, *Lyall* in 1860; Blue Mountains, *Piper* 2326; locality unknown, *Vasey* 410; Clallam County, *Elmer* 2819.

Zonal distribution: Hudsonian.

7. **Polemonium amoenum** Piper, Erythea **7**: 174. 1899.

Type locality: "Humptulips, Chehalis County, Wash." Collected by F. H. Lamb.

Range: Known only from the type locality.

Specimens examined: Humptulips, *Lamb* 1178; Humptulips Prairie, *Conard* 98.

HYDROPHYLLACEAE. Waterleaf Family.

- Leaves all basal; peduncles 1-flowered.......................... Capnorea (p. 467).
- Leaves not all basal.
  - Styles entire.. Romanzoffia (p. 468).
  - Styles 2-cleft.
    - Corolla convolute in bud; placentae broad.
      - Perennials; stamens exserted.................. Hydrophyllum (p. 468).
      - Annuals; stamens included...................... Nemophila (p. 469).
    - Corolla imbricated in bud; placentae narrow.
      - Flowers in a scorpioid cyme...................... Phacelia (p. 470).
      - Flowers solitary in the leafy forks of the stem.... Conanthus (p. 472).

CAPNOREA.

- Corolla campanulate.. 1. *C. lasiantha.*
- Corolla saucer-shape.
  - Leaves glabrous, except on the margins.
    - Calyx lobes very unequal.. 2. *C. fulcrata.*
    - Calyx lobes subequal... 3. *C. pumila.*
  - Leaves pubescent beneath.
    - Pubescence appressed.. 4. *C. villosula.*
    - Pubescence not appressed....................................... 5. *C. hirtella.*

1. **Capnorea lasiantha** Greene, Pittonia **5**: 47. 1902.

Capnorea macilenta Greene, op. cit. 48.

Type locality: Eastern Washington, without station. Collected by G. R. Vasey.

Range: Washington, Oregon, and Idaho.

Specimens examined: Ellensburg, *Whited* 66; Sprague, *Henderson*, May 30, 1892; Spokane, *Piper*, May, 1898; Medical Lake, *Sandberg & Leiberg* 52; Rock Creek, *Piper* 2793; Pasco, *Hindshaw* 23; Coulee City, *Piper* 3864; without locality, *Vasey* in 1889; Wenas River, *Cotton* 916.

Zonal distribution: Arid Transition.

2. **Capnorea fulcrata** Greene, Pittonia **5**: 51. 1902.

TYPE LOCALITY: "From somewhere in the State of Washington." Collected by G. R. Vasey.

SPECIMENS EXAMINED: Without locality, *Vasey* in 1889; without locality, *Brandegee* 979 in part; Wenache Mountains, *Cotton* 1234.

ZONAL DISTRIBUTION: Arid Transition.

3. **Capnorea pumila** (Dougl.) Greene, Erythea **2**: 193. 1894.

Villarsia pumila Dougl.; Griseb. in Hook. Fl. Bor. Am. **2**: 70. 1838.

Hesperochiron pumilus Porter; Hayden, Geol. Rep. 768. 1872.

Capnorea nervosa Greene, Pittonia **5**: 51. 1902.

TYPE LOCALITY: "Amer. boreali occ." Collected by Douglas in 1829.

RANGE: Washington, Oregon, and Idaho.

SPECIMENS EXAMINED: Blue Mountains, *Horner* R105; B354; without locality, *Suksdorf* in 1878.

An authentic Douglasian specimen of *Villarsia pumila* in the Gray Herbarium is the same as *Capnorea nervosa* Greene.

ZONAL DISTRIBUTION: Arid Transition.

4. **Capnorea villosula** Greene, Pittonia **5**: 52. 1902.

TYPE LOCALITY: Pullman, Washington.

RANGE: Known only from the type locality.

SPECIMENS EXAMINED: Pullman, *Elmer* 1001; *Piper* 1698.

ZONAL DISTRIBUTION: Arid Transition.

5. **Capnorea hirtella** Greene, Pittonia **5**: 51. 1902.

TYPE LOCALITY: "Wet prairies of Eastern Washington." Collected by Howell.

SPECIMENS EXAMINED: Eastern Washington, *Howell* April, 1890.

ROMANZOFFIA.

1. **Romanzoffia sitchensis** Bong. Mem. Acad. St. Petersb. VI. **2**: 158. 1832.

TYPE LOCALITY: Sitka.

RANGE: Alaska to Washington.

SPECIMENS EXAMINED: Olympic Mountains, *Piper* 2233; Silverton, *Bouck* 149 (pedicels glandular!); Bridge Creek, *Elmer* 690; Mount Baker, *Flett* 863; Green River Hot Springs, *Piper* in 1887; Mount Rainier, *Flett* 229; Goat Mountains, *Allen* 236.

ZONAL DISTRIBUTION: Hudsonian and Canadian.

HYDROPHYLLUM. WATERLEAF.

Flowers in dense clusters; leaf lobes obtuse........................ 1. *H. capitatum.*
Flowers in loose clusters; leaf lobes usually acutish.
  Calyx lobes pubescent on the back and ciliate with long, soft hairs; leaves with 5 to 9 scattered segments, paler beneath............ 2. *H. albifrons.*
  Calyx lobes glabrous on the back, hirsute-ciliate, basal leaves with 5 approximate segments.................................. 3. *H. tenuipes.*

1. **Hydrophyllum capitatum** Dougl., Benth. Linn. Trans. **17**: 273. 1837.

TYPE LOCALITY: "In the interior of the Columbia in Northwest America." Collected by Douglas.

RANGE: Washington and Idaho to California and Utah.

SPECIMENS EXAMINED: Klickitat River, *Flett* 1249; Simcoe Hills, *Howell*, June, 1879; without locality, *Vasey* in 1889; Wenache, *Whited* 23; Clealum, *Henderson*, June 11, 1892; Hangman Creek, *Sandberg & Leiberg* 45, Pullman, *Elmer* 1002; *Moore*, May, 1893; *Piper* 1893, 1696.

ZONAL DISTRIBUTION: Arid Transition.

2. **Hydrophyllum albifrons** Heller, Bull. Torr. Club **25**: 267. 1898.

Hydrophyllum congestum Wiegand, Bull. Torr. Club **26**: 136. 1899.

TYPE LOCALITY: Lake Waha, Nez Perces County, Idaho.

RANGE: Washington and Idaho.

SPECIMENS EXAMINED: Nason Creek, *Sandberg & Leiberg* 658; Okanogan County, *Whited* 222; Silverton, *Bouck* 150; Mount Rainier, *Piper* 2124; Mount Adams, *Suksdorf* 453, 591; *Henderson* 685; Goat Mountains, *Allen* 232; Klickitat River, *Flett* 1250; without locality, *Vasey* in 1889; Pullman, *Piper* 1697; *Hull* 773; Blue Mountains, *Horner* 3351; Wenache Mountains, *Cotton* 1183½.

ZONAL DISTRIBUTION: Arid Transition and Canadian.

This species is very close to *H. fendleri* (A. Gray) Heller, to which it has been referred. The plant called *H. macrophyllum* Nutt. in Cooper's Report is probably *H. albifrons*, which has also been confused with *H. occidentale* (S. Wats.) A. Gray, a species of more southern range.

The type specimen of *H. congestum* Wiegand really came from Mount Rainier (Mount Tacoma) and not from Tacoma as published.

3. **Hydrophyllum tenuipes** Heller, Bull. Torr. Club **25**: 582. 1898.

TYPE LOCALITY: Montesano, Washington.

RANGE: British Columbia to Oregon, west of the Cascade Mountains.

SPECIMENS EXAMINED: Montesano, *Heller* 3853; Hoquiam, *Lamb* 1140; Clallam County, *Elmer* 2831; Ilwaco, *Piper* 5000; Seattle, *Piper* 260, 3020; Skokomish River, *Kincaid*, May 16, 1902; Tacoma, *Flett* 1768; Quinault, *Conard* 134; without locality, *Wilkes Expedition*.

ZONAL DISTRIBUTION: Humid Transition.

Two quite distinct forms of this species occur, but satisfactory characters to separate them are not evident. The coast form like Piper's 5000 has dark blue flowers on long peduncles, and thick leaves coarsely and doubly crenate-dentate, while the form away from the immediate coast has thinner leaves, simply dentate, and pale flowers on shorter peduncles.

Hydrophyllum tenuipes has heretofore been referred to *H. virginicum* L.

NEMOPHILA.

Corolla campanulate, bluish.................................... 1. *N. sepulta*.
Corolla tubular or tubular-campanulate, white.
  Leaves mostly alternate; corolla shorter than calyx............... 2. *N. breviflora*.
  Leaves mostly opposite; corolla equaling the calyx or longer.
    Seeds mostly 6 to 8 per capsule; leaves oblong............... 3. *N. pedunculata*.
    Seeds mostly 4 per capsule; leaves ovate..................... 4. *N. parviflora*.

1. **Nemophila sepulta** Parish, Erythea **7**: 93. 1899.

Nemophila densa Howell, Fl. N. W. Am. 466. 1901.

Nemophila minutiflora Suksdorf, West Am. Sci. **14**: 22. 1903.

Nemophila menziesii minutiflora Suksdorf, Deutsch. Bot. Monatss. **18**: 133. 1900.

Nemophila reticulata Suksdorf, West Am. Sci. **14**: 22. 1903.

Nemophila erosa Suksdorf, op. cit. 23.

TYPE LOCALITY: Bear Valley, San Bernardino Mountains, California.

RANGE: Washington to California.

SPECIMENS EXAMINED: West Klickitat County, *Suksdorf* 684, 397; Bingen, *Suksdorf* 2198; Clarke County, *Suksdorf* 2315.

2. **Nemophila breviflora** A. Gray, Proc. Am. Acad. **10**: 315. 1875.

TYPE LOCALITY: "Mountains of Utah." Collected by Watson.

RANGE: Washington to Montana, Wyoming, and Utah.

SPECIMENS EXAMINED: Cleman Mountain, *Henderson*, June 14, 1892; Klickitat County, *Suksdorf* in 1881; Klickitat River, *Flett* 1013; Blue Mountains, *Piper*, July, 1896.

ZONAL DISTRIBUTION: Canadian.

3. **Nemophila pedunculata** Dougl.: Benth. Linn. Trans. **17**: 275. 1837.

Type locality: "On the Columbia." Collected by Douglas.

Range: Washington to California.

Specimens examined: Klickitat County, *Suksdorf* 2637, 2638.

4. **Nemophila parviflora** Dougl.; Benth. Linn. Trans. **17**: 275. 1837.

Type locality: "From the Columbia." Collected by Douglas and by Scouler.

Range: British Columbia to California in the coast region.

Specimens examined: Clallam County, *Elmer* 2830; Whidby Island, *Gardner* 395; Seattle, *Piper* in 1885; upper Nisqually Valley, *Allen* 61; without locality, *Vasey* in 1889; Vancouver, *Piper* 4940.

Zonal distribution: Humid Transition.

PHACELIA.

Leaves entire or with a few much smaller lateral lobes.
- Flowers bright blue, rather large.
  - Low, branched from the base; ovules only 4................ 1. *P. humilis.*
  - Taller, erect; ovules 10 or more............................ 2. *P. linearis.*
- Flowers white or bluish, small.
  - Herbage canescent.. 3. *P. heterophylla.*
  - Herbage green, hirsute.................................... 4. *P. nemoralis.*

Leaves pinnately cleft into narrow subequal lobes.
- Annual; stems erect.. 9. *P. glandulifera.*
- Perennials.
  - Stems erect.
  - Stems weak, reclining...................................... 8. *P. ramosissima.*
    - Leaves silky; inflorescence not glandular................ 5. *P. sericea.*
    - Leaves green; inflorescence glandular.
      - Calyx not ciliate; leaves not glandular.............. 6. *P. procera.*
      - Calyx ciliate; leaves glandular..................... 7. *P. lenta.*

1. **Phacelia humilis** Torr. & Gr. Pac. R. Rep. **2**: 122. 1855–57.

Type locality: "Near the summit of the Sierra Nevada, California."

Range: Washington to Nevada and California.

Specimens examined: Cleman Mountain, *Henderson* 2541; Egbert Springs, *Sandberg & Leiberg* 352; Yakima region, *Brandegee* 974; Wenache, *Whited* 1103, 35; Douglas County, *Spillman*, May, 1896.

Zonal distribution: Upper Sonoran.

2. **Phacelia linearis** (Pursh) Holzinger, Contr. Nat. Herb. **3**: 242. 1895.

Phacelia menziesii Torr.; S. Wats. Bot. King. Explor. 252. 1871.

Hydrophyllum lineare Pursh, Fl. 1: 134. 1814.

Eutoca menziesii R. Br. in Richards. Bot. App. Frankl. Journ. 764. 1823.

Eutoca multiflora Dougl.; Lindl. Bot. Reg. **14**: *pl. 1180*. 1828.

Type locality: "On the banks of the Missouri. April." Collected by Lewis. The specimen in the Philadelphia Academy bears the label "Rocky Camp, April 17, 1806." This spot is on the Dalles of the Columbia, and it is probable that Pursh has made an error.

Range: British Columbia and Alberta to California and Utah.

Specimens examined: Whidby Island, *Gardner* 210; Mount Adams, *Flett* 1247; Rattlesnake Mountains, *Cotton* 330; Yakima, *Henderson*, May 25, 1892; North Yakima, *Mrs. Steinweg* in 1894; Pasco, *Piper* 2958; *Hindshaw* 24; Rock Lake, *Sandberg & Leiberg* 116; Pend Oreille River, *Lyall* in 1861; without locality, *Vasey* in 1889; along Tukanon River, *Lake & Hull*, July 2, 1892; Spokane, *Piper*, July 18, 1894; Almota, *Piper* 1695; Wawawai, *Lake & Hull* 566; *Elmer* 782.

Zonal distribution: Upper Sonoran and Arid Transition.

3. **Phacelia heterophylla** Pursh, Fl. **1**: 140. 1814.

Phacelia hastata Dougl.; Lehm. Pug. **2**: 20. 1830.

TYPE LOCALITY: "On dry hills on the banks of the Kooskooskee," Idaho. Collected by Lewis.

RANGE: British Columbia to Dakota, Arizona, and California.

SPECIMENS EXAMINED: Peshastin, *Sandberg & Leiberg*, August, 1893; Wenache, *Whited* 23, 1129; Ellensburg, *Elmer* 388; Wilson Creek, *Lake & Hull* 567; Pasco, *Hindshaw* 24; Spokane, *Henderson* 2564; Wawawai, *Lake & Hull* 567; without locality, *Vasey* in 1889; Rattlesnake Mountains, *Cotton* 475; Clarks Springs, *Kreager* 116; Kalispel Lake, *Kreager* 445; Clallam County, *Elmer* 2829?; "North Branch of the Columbia," *Wilkes Expedition*.

ZONAL DISTRIBUTION: Arid Transition and Upper Sonoran.

4. **Phacelia nemoralis** Greene, Pittonia, **1**: 141. 1887.

TYPE LOCALITY: "Common in the hills behind Oakland and Berkeley, California."

RANGE: Washington to California, in the coast region.

SPECIMENS EXAMINED: Chehalis County, *Lamb* 1161; Shoalwater Bay, *Cooper* in 1854; Montesano, *Heller* 3923; Silverton, *Bouck* 148; Mount Rainier, *Piper*, August, 1895; Horseshoe Basin, *Lake & Hull*, August 24, 1892; Skokomish River, *Kincaid*, June 25, 1892; Cascade Mountains, latitude 49°, *Lyall* in 1859; Columbia River, *Scouler;* Puget Sound, *Wilkes Expedition.*

ZONAL DISTRIBUTION: Humid Transition.

5. **Phacelia sericea** (Graham) A. Gray, Proc. Am. Acad. **10**: 323. 1875.

Eutoca sericea Graham; Hook. Bot. Mag. **57**: *pl. 3003.* 1830.

TYPE LOCALITY: "Rocky Mountains, North America." Collected by Drummond.

RANGE: British Columbia to Saskatchewan, southward to Colorado and Nevada.

SPECIMENS EXAMINED: Clallam County, *Elmer* 2827; Mount Steele, *Piper* 2229; Mount Adams, *Henderson*, August 10, 1892; Puyallup Glacier, *Flett* 265; Klickitat River, *Flett* 1248; Mount Rainier, *Smith* in 1889; *Flett* 2174.

ZONAL DISTRIBUTION: Arctic.

6. **Phacelia procera** A. Gray, Proc. Am. Acad. **10**: 323. 1875.

TYPE LOCALITY: "Mountain meadows of the Sierra Nevada in Sierra and Nevada Counties," California.

RANGE: Washington to California.

SPECIMENS EXAMINED: Trout Lake, *Suksdorf* 412; Simcoe Mountains, *Howell* 334; Cleman Mountain, *Henderson*; near Wenache, *Whited* 146, 1160; Peshastin, *Sandberg & Leiberg* 500; Leavenworth, *Savage* 30.

ZONAL DISTRIBUTION: Canadian.

7. **Phacelia lenta** Piper, Bull. Torr. Club **28**: 44. 1901.

TYPE LOCALITY: "Bare hills of the Columbia River," Washington. Collected by Brandegee.

RANGE: Eastern Washington. Known only by the type specimen.

SPECIMENS EXAMINED: Columbia River, *Brandegee* 976.

8. **Phacelia ramosissima** Dougl.; Lehm. Pug. **2**: 21. 1830.

TYPE LOCALITY: None given. According to Hooker: "Dry rocky plains of the Columbia near Priests Rapid and at the Stony Island." Collected by Douglas.

RANGE: Washington to California and Arizona.

SPECIMENS EXAMINED: Near Orondo, *Whited* 196; near Priest Rapids, *Brandegee* 975; Wenache, *Whited* 1304, 1375; Crab and Wilson creeks, *Sandberg & Leiberg* 288; Soap Lake, *McKay* 1.

ZONAL DISTRIBUTION: Upper Sonoran.

9. Phacelia glandulifera, sp. nov.

Annual, branched from the base, 5 to 30 cm. high, hispid, and glandular throughout; leaves oblong, pinnately parted into 11 to 15 narrow divisions, these acutish and mostly 2 to 6-lobed; calyx lobes spatulate-oblanceolate, obtuse, entire or rarely bearing a single lobe, hispid and glandular, about 6 mm. long in flower, becoming twice as long and remaining erect in fruit; corolla pale violet, campanulate-funnelform, 6 mm. long, barely exceeding the calyx, 15-nerved, its rounded lobes 1.5 mm. long, the crests very obscure or wanting; stamens included, the slender filaments subulate, unequally inserted toward the base, the white anthers cordate-reniform; style 2-cleft at apex; stigmas capitate; capsule oblong, 5 to 6 mm. long, obtuse, sparsely hispidulous; seeds about 12, angular, lanceolate-oblong, beautifully tuberculate in transverse rows, 1.7 mm. long.

This plant has long been confused with *P. ivesiana* Torr. of the Great Basin region southward, though attention was called to its distinctness long since.[a] *P. ivesiana* differs in having its herbage more hispid and nearly glandless, and in having broader, obtuse, mostly entire leaf lobes, glandless calyx, and more deeply corrugated seeds.

SPECIMENS EXAMINED: Washington—Junction Crab and Wilson creeks, Douglas County, *Sandberg & Leiberg* 306, June, 1893; Pasco, *Piper* 2954, May 25, 1899 (type); same locality, *Henderson* 2540; Morgan's Ferry, Yakima County, *Suksdorf* 398. Oregon—Sage Plains, *Howell*, June 16, 1885; Ontario, *Leiberg* 2015; Guano Ranch, *Coville & Leiberg* 5, July 24, 1896; eastern Oregon, *Cusick* 1670. Idaho -without locality, *Hayden* in 1872; Big Butte Station, *Palmer* 590; Blue Lakes, *Palmer* 65.

ZONAL DISTRIBUTION: Upper Sonoran.

CONANTHUS.

1. Conanthus parviflorus Greenman, Erythea 7: 117. 1899.

Gilia hispida Piper, Erythea 6: 30. 1898, not *Conanthus hispidus* Heller nor *Nama hispida* A. Gray. 1862.

TYPE LOCALITY: "Oregon in sandy soil of the Malheur." Collected by Cusick.

RANGE: Eastern Washington and eastern Oregon.

SPECIMENS EXAMINED: Near Morgan's Ferry, *Suksdorf* 390; Wallula, *Brandegee* 978; Pasco, *Piper* 2968; *Hindshaw*, May 25, 1896; *Henderson* 2402; *Piper*, July 10, 1897.

ZONAL DISTRIBUTION: Upper Sonoran.

Washington specimens referred to *Nama demissum* A. Gray and *Conanthus aretioides* Wats. belong to this species.

BORAGINACEAE. BORAGE FAMILY.

Ovary undivided, sometimes 2 to 4-grooved; style terminal.
  Style entire; stigma peltate........................ HELIOTROPIUM (p. 473).
  Style 2-cleft; stigmas capitate........................ COLDENIA (p. 474).
Ovary 4-parted; the style arising from between the parts.
  Nutlets armed with barbed prickles.
    Nutlets erect, prickly on the margins and sometimes on the back................................ LAPPULA (p. 474).
    Nutlets spreading, prickly all over.................. CYNOGLOSSUM (p. 476).
  Nutlets not armed with barbed prickles.
    Calyx much enlarged and membranous in fruit...... ASPERUGO (p. 476).
    Calyx not much enlarged nor membranous in fruit.
      Corolla tubular or tubular-funnelform, blue .... MERTENSIA (p. 476).
      Corolla funnelform or rotate.
        Nutlets erect attached by the very base.
          Racemes bractless; corolla rotate; roots slender.......................... MYOSOTIS (p. 486).

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[a] Coville, Contr. Nat. Herb. 4: 159. 1893.

Racemes bracteate; corolla funnelform; roots thick........................ LITHOSPERMUM (p. 486).

Nutlets erect or oblique, attached above the base, a more or less prominent fruiting receptacle (gynobase).

Corolla yellow or orange, with naked open throat........................ AMSINCKIA (p. 480).

Corolla white or blue with throat more or less fornicate—that is, bearing prominent swellings.

Nutlets very flat and thin, attached above the middle, the margins spinulose...................... PECTOCARYA (p. 482).

Nutlets thick, attached at or below the middle.

Perennials.

Corolla blue; nutlets oblique, the dorsal surface with an acute, entire or spiny margin.......... ERITRICHIUM (p. 480).

Corolla white or whitish; nutlets ovate-trigonous. OREOCARYA (p. 481).

Annuals.

Calyx circumscissile...... PIPTOCALYX (p. 481).

Calyx not circumscissile.

Gynobase elongate, the nutlets attached by one-third their length or more.... CRYPTANTHE (p. 483).

Gynobase low.

Nutlets oblique or incurved, attached about the middle by a caruncle-like process; leaves all alternate.. PLAGIOBOTHRYS (p. 482).

Nutlets attached just inside the base; lower leaves opposite ALLOCARYA (p. 485).

HELIOTROPIUM.

1. **Heliotropium curassavicum** L. Sp. Pl. 1: 130. 1753.

? *Heliotropium chenopodioides* Willd. Enum. Hort. Berol. 175. 1809.

TYPE LOCALITY: "In Americae calidioris maritimis."

RANGE: Washington to Virginia and southward.

SPECIMENS EXAMINED: Junction Crab and Wilson creeks, *Sandberg & Leiberg* 339; Walla Walla, *Lyall*, June, 1860; Waitsburg, *Horner* 379; without locality, *Vasey* in 1889; Wallula, *Cotton* 1074*a*.

ZONAL DISTRIBUTION: Upper Sonoran.

COLDENIA.

1. **Coldenia nuttallii** Hook. Journ. Bot. & Kew Misc. 3: 296. 1851.

Tiquilia parvifolia Nutt.; Hook. loc. cit. as synonym.

TYPE LOCALITY: "Rocky Mountains." Collected by Nuttall.

RANGE: Washington to Wyoming, Arizona, and California.

SPECIMENS EXAMINED: Egbert Springs, *Sandberg & Leiberg* 343; Kennewick, *Piper*, July 10, 1897; Pasco, *Elmer* 1061; *Henderson*, June, 1892; without locality, *Brandegee* 982.

ZONAL DISTRIBUTION: Upper Sonoran.

LAPPULA.

Annuals; scar of the nutlets linear.	
Lateral prickles of the fruit free	8. *L. occidentalis.*
Lateral prickles of the fruit united	9. *L. cupulata.*
Perennials; scar of nutlets triangular or ovate.	
Lateral prickles united for about half their length.	
Corolla greenish, the lobes broadest at base	6. *L. hispida.*
Corolla blue, the lobes narrowest at base	7. *L. ciliata.*
Lateral prickles of the fruit free to the base or nearly so.	
Swellings in throat of corolla pubescent.	
Flowers white; pubescence, harsh, appressed	1. *L. arida.*
Flowers blue; pubescence soft, not appressed	2. *L. saxatilis.*
Swellings in throat of corolla not pubescent.	
Flowers white; swellings as long as broad	5. *L. hendersoni.*
Flowers blue; swellings broader than long.	
Corolla 4 to 6 mm. broad	3. *L. floribunda.*
Corolla 8 to 10 mm. broad	4. *L. diffusa.*

1. **Lappula arida** Piper, Bull. Torr. Club 28: 44. 1901.

Lappula cottoni Piper, Bull. Torr. Club 29: 549. 1902.

TYPE LOCALITY: Ellensburg, Washington.

RANGE: Washington and Oregon.

SPECIMENS EXAMINED: Wenache, *Whited*, June, 1896 and 1047; Ellensburg, *Elmer* 385; *Whited* 324; *Piper* 2676; Peshastin, *Sandberg & Leiberg* 595; Douglas County, *Spillman*, May 27, 1896; junction Crab and Wilson creeks, *Sandberg & Leiberg* 277; Coulee City, *Piper* 3840; without locality, *Vasey* in 1889; Chelan Butte, *Griffiths & Cotton* 173; Wenache Mountains, *Griffiths & Cotton* 126; Rattlesnake Mountains, *Cotton* 360, 579, 650.

ZONAL DISTRIBUTION: Upper Sonoran.

2. **Lappula saxatilis** Piper, Bull. Torr. Club 29: 541. 1902.

TYPE LOCALITY: "Rocky sides of canons, Klickitat River, Wash." Collected by Suksdorf. Not otherwise known.

3. **Lappula floribunda** (Lehm.) Greene, Pittonia 2: 182. 1891.

Echinospermum floribundum Lehm. Pug. 2: 24. 1830.

TYPE LOCALITY: "Lake Pentanguishene to the Rocky Mountains," collected by *Drummond*, according to Hooker.

RANGE: Washington to Saskatchewan, Colorado, and California.

SPECIMENS EXAMINED: Yakima Region, *Brandegee* 986.

4. **Lappula diffusa** (Lehm.) Greene, Pittonia 2: 182. 1891.

Echinospermum diffusum Lehm. Pug. 2: 23. 1830.

TYPE LOCALITY: "N. W. America," collected by Douglas, according to Hooker.

RANGE: British Columbia to California, Montana, and Utah.

Specimens examined: Wenache Mountains, *Whited* 1258; mountains near Ellensburg, *Piper* 2669; upper Yakima River, *Lyall* in 1860; Klickitat River, *Suksdorf* 592; *Flett* 1011; Blue Mountains, *Horner* 121, 341; without locality, *Vasey* in 1889.

Zonal distribution: Canadian.

5. **Lappula hendersoni** Piper, Bull. Torr. Club **29**: 539. 1902.

Type locality: "Clemens Mountains, Yakima County, Washington." Collected by Henderson.

Range: Eastern slope of the Cascade Mountains in Washington and Oregon.

Specimens examined: Klickitat County, *Suksdorf*, June, 1881; Upper Yakima, *Lyall* in 1860; Cleman Mountain, *Henderson*, June 14, 1892.

6. **Lappula hispida** (A. Gray) Greene, Pittonia **2**: 182. 1891.

Echinospermum diffusum hispidum A. Gray, Proc. Am. Acad. **17**: 225. 1882.

Echinospermum hispidum A. Gray, Syn. Fl. ed. 2. 2^1: 422, 1886.

Type locality: Rocky hillsides of Pine Creek near the mouth, Union County, Oregon. Collected by Cusick.

Range: Northeastern Oregon and adjacent Washington.

Specimens examined: Asotin County, *Sheldon* in 1897.

7. **Lappula ciliata** (Dougl.) Greene, Pittonia **2**: 182. 1891.

Cynoglossum ciliatum Dougl.; Lehm. Pug. **2**: 24. 1830.

Echinospermum ciliatum A. Gray, Proc. Am. Acad. **17**: 225. 1882.

Type locality: "Kettle Falls and Spokane River, Washington." Collected by Douglas.

Range: Spokane and Stevens counties, Washington.

Specimens examined: Chewelah, *John K. Ely* 55; Spokane, *Dewart*, May 6, 1901; *Piper* 2292; *Henderson*, June, 1892; Spokane and Kettle Falls, *Douglas* in 1826; Clarks Springs, *Kreager* 95.

Zonal distribution: Arid Transition.

8. **Lappula occidentalis** (S. Wats.) Rydberg, Mem. N. Y. Bot. Gard. **1**: 329. 1900.

Echinospermum redowskii occidentale S. Wats. Bot. King Explor. 246. 1871.

Lappula fremontii Howell, Fl. N. W. Am. 480. 1901.

Type locality: "In the valleys and on the mountains from the Sierras to the Wahsatch."

Range: Alaska to Minnesota and Arizona.

Specimens examined: Berne, *Piper*, July 7, 1895; Wenache, *Whited* 32, 1048, 1226; Ellensburg, *Elmer* 430; *Whited* 342, 389; Douglas County, *Spillman*, May 27, 1896; North Yakima, *Mrs. Steinweg* in 1894; *Flett* 1034; Pasco, *Hindshaw* 17; *Piper* 2952; Spokane, *Piper* 2691; Sprague, *Sandberg & Leiberg* 174; Rattlesnake Mountains, *Cotton* 407; Kalispel Lake, *Kreager* 441; Meyers Falls, *Kreager* 502; North Yakima, *Henderson*, May 25, 1892; Moxee to North Yakima, *Griffiths & Cotton* 35; Davis Lake, *Kreager* 441; Meyers Falls, *Kreager* 502; Wenache, *Whited*, April 15, 1902; Rattlesnake Mountains, *Cotton* 407.

Zonal distribution: Upper Sonoran and Arid Transition.

A specimen collected at Spokane (*Sandberg, Heller, & MacDougal* 928) was erroneously determined and listed as *Lappula lappula* (L.) Karst.[a]

9. **Lappula cupulata** (A. Gray) Rydberg, Bull. Torr. Club **28**: 31. 1901.

Echinospermum redowskii cupulatum A. Gray, Bot. Cal. **1**: 530. 1876.

Lappula columbiana A. Nelson, Bot. Gaz. **34**: 28. 1902.

Type locality: Trinity Mountains, Nevada. Collected by Watson.

Range: Washington and Idaho to Nevada and Colorado.

Specimens examined: Almota, *Piper* 1703.

Zonal distribution: Upper Sonoran.

Our plant is identical with the type of *L. cupulata*.

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[a] Contr. Nat. Herb. **3**: 242, 1895.

CYNOGLOSSUM.

1. **Cynoglossum grande** Dougl.: Lehm. Pug. **2**: 25. 1830.
Type locality: "Shady Woods, N. W. Coast." Collected by **Douglas**.
Range: Washington to California in the coast region.
Specimens examined: West Klickitat County, *Suksdorf* 92; Fort Vancouver, *Tolmie*.

ASPERUGO.

1. **Asperugo procumbens** L. Sp. Pl. **1**: 138. 1753.
Type locality: European.
Specimens examined: Spokane, *Piper* 2721.

MERTENSIA.

- Plants tall and leafy, 50 to 100 cm. high, the leaves thin and broad.
  - Leaves glabrous on both sides or merely papillose above; calyx smooth on the back.
    - Calyx lobes elongate, acute, much longer than the fruit.
      - Leaves few, green, oblong-lanceolate, obtuse or acutish .... 1. *M. infirma*.
      - Leaves many, pallid, ovate, acuminate .... 2. *M. laevigata*.
    - Calyx lobes short and obtuse, or triangular and acute, not longer than the fruit.
      - Leaves acute, mostly sessile; calyx lobes obtuse... 3. *M. ambigua*.
      - Leaves acuminate, short-petioled; calyx lobes acute. 4. *M. brachycalyx*.
  - Leaves pilose beneath.
    - Upper leaf surface strigose.
      - Calyx lobes canescent .... 5. *M. membranacea*.
      - Calyx lobes not canescent.
        - Dorsal surface of calyx lobes glabrous .... 6. *M. paniculata*.
        - Dorsal surface of calyx lobes pubescent...... 7. *M. platyphylla*.
    - Upper leaf surface smooth or merely papillose.
      - Calyx lobes pubescent on back.................. 8. *M. subcordata*.
      - Calyx lobes glabrous on back................... 9. *M. leptophylla*.
- Plants low, 15 to 40 cm. high, the leaves narrow or thickish.
  - Roots tuberous or fasciculate-tuberous, shallow-seated; basal leaves, none.
    - Leaves glabrous or merely papillose above.
      - Herbage not glaucous .... 10. *M. pulchella*.
      - Herbage glaucous............................ 10a. *M. pulchella glauca*.
    - Leaves strigose above.
      - Corolla tube 3 or 4 times as long as the limb...... 11. *M. oblongifolia*.
      - Corolla tube once or twice as long as the limb .... 12. *M. horneri*.
  - Roots not tuberous, vertical; basal leaves numerous, their dry bases persistent on the crown.
    - Leaves pubescent on both sides..................... 13. *M. pubescens*.
    - Leaves not pubescent on both sides.
      - Leaves glabrous on both sides.................. 14. *M. nutans*.
      - Leaves strigillose above .... 14a. *M. nutans subcalva*.

1. **Mertensia infirma** sp. nov.

Glabrous throughout except the ciliate margins of the leaves and calyx lobes; stems weak, erect or nearly so, 50 to 60 cm. high; basal and lower cauline leaves oblanceolate, obtuse, the blades 5 to 7 cm. long, shorter than the margined petioles; middle and upper cauline leaves lanceolate, acute or acutish, 5 to 10 cm. long, narrowed toward the base, sessile or short-petioled; inflorescence rather open, the bracts foliaceous; petioles slender, papillate near the calyx; calyx divided nearly to the base, the lance-oblong lobes smooth excepting the appressed-ciliate margin, about one-third as long as the corolla-tube; corolla bright blue, about 18 mm. long, the ampliate limb distinctly shorter than the tube; filaments dilated, longer than the anthers; fruit not seen.

In damp thickets, Ellensburg, April 25, 1897, *Kirk Whited* 307.

This species is allied to *M. intermedia* Rydberg, but is at once distinguished by the larger corolla with relatively longer tube. The type is in the U. S. National Herbarium (sheet no. 366088).

2. **Mertensia laevigata** sp. nov.

Stems stout, erect, more or less glaucous, 40 to 90 cm. high; leaves pale or glaucescent, numerous, the cauline ovate, acuminate, glabrous or somewhat papillate above, glabrous beneath, ciliate on the margin, 5 to 7 cm. long, short-petioled; inflorescence loose, the pedicels appressed-pubescent or muriculate; calyx divided nearly to the base, its lobes lance-oblong, acute, ciliate, smooth on the back, over half as long as the corolla tube; corolla blue, 14 mm. long, the somewhat ampliate limb as long as the tube; filaments dilated, shorter than the anthers; nutlets finely muriculate, pale, the scar of attachment central.

The following specimens are referred here: Goat Mountains, *O. D. Allen*, no. 231, July 22, 1896; Mount Rainier, *Piper* 2116, altitude 2,000 m., August 15, 1895; type sheet no. 336914 in U. S. National Herbarium; Klickitat River, *Flett* 1199, June 27, 1899; Mount Stuart, *Elmer* 1195, August, 1898; "California Bob" Peak, Olympic Mountains, *Lamb* 1383, August 4, 1897; Simcoe Mountains, *Howell*, June 6, 1899; Mount Rainier, *Piper* 2116.

3. **Mertensia ambigua** sp. nov.

Stems glabrous and leafy, about 60 cm. high; leaves thin, acute, more or less papillose above, sparsely scabrous-ciliate on the margins, the lower cauline lanceolate or lance-ovate, 8 or 10 cm. long, on petioles of nearly equal length, the middle and upper cauline oblong or oblong-ovate, or the uppermost ovate and sessile; inflorescence loose and open; pedicels muriculate; calyx short, its lobes oblong, scarcely broader at base, mostly obtuse, smooth on the back, ciliate, only one-fifth as long as the corolla tube, and in fruit exceeded by the nutlets; corolla blue, 12 mm. long, the tube about twice as long as the slightly enlarged throat; filaments dilated, shorter than the anthers; nutlets pale, distinctly keeled on the back, slightly tuberculate, the triangular scar central.

Collected by G. R. Vasey in the Cascade Mountains of central Washington in 1889. The type sheet is in the U. S. National Herbarium, no. 296759.

4. **Mertensia brachycalyx** sp. nov.

Whole plant glabrous except the ciliate margins of the leaves and calyx lobes; stems stout, erect, leafy, a meter or more high; leaves bright green, lance-ovate, or the lower cauline lanceolate, smooth beneath, usually papillose above, 5 to 10 cm. long, the lower ones petioled; inflorescence leafy and open, the flowers in small clusters subtended by a pair of leafy bracts on slender branches; calyx small, glabrous, the short triangular acute lobes often unequal; corolla blue, about 12 mm. long, the tube as long as the strongly ampliate throat; filaments dilated, much shorter than the anthers; fruit whitish, nearly smooth, convex on back.

Collected near Nason Creek, Chelan County, at an altitude of 1,400 meters by Sandberg & Leiberg, no. 678, August 14, 1893, the type in the U. S. National Herbarium.

5. **Mertensia membranacea** Rydberg, Bull. Torr. Club **28**: 33. 1901.

TYPE LOCALITY: Priest River, Idaho.

RANGE: Idaho and adjacent Washington and Oregon.

SPECIMENS EXAMINED: Davis Ranch near Mount Carlton, *Kreager* 202, 216.

6. Mertensia paniculata (Ait.) G. Don, Hist. Dichl. Pl. 4: 318. 1838.

Pulmonaria paniculata Ait. Hort. Kew. 1: 181. 1789.

TYPE LOCALITY: Hudson Bay.

RANGE: Alaska to Hudson Bay, Minnesota and Washington.

SPECIMENS EXAMINED: Mount Carlton, *Kreager* 190.

7. Mertensia platyphylla Heller, Bull. Torr. Club 26: 548. 1899.

? *Lithospermum denticulatum* Lehm. Asper. 2: 294. 1818.

TYPE LOCALITY: Montesano, Washington. Collected by Heller.

RANGE: Western Washington.

SPECIMENS EXAMINED: Montesano, *Heller* 3872; New London, *Lamb* 1168; Skokomish River, *Kincaid*, May 16, 1892.

ZONAL DISTRIBUTION: Humid Transition.

According to Hooker the type of *Lithospermum denticulatum* Lehm. was collected in "Shady woods near the confluence of the Columbia with the sea. Douglas. Mr. Tolmie." It has usually been considered a synonym of *Mertensia sibirica* L., but it probably will prove it to be *M. platyphylla* Heller.

8. Mertensia subcordata Greene, Pittonia 4: 89. 1899.

TYPE LOCALITY: Roseburg, Oregon.

RANGE: Washington and Oregon.

SPECIMENS EXAMINED: Cascade Mountains, *Henderson* 2259; Mount Stuart, *Whited* 796; Blue Mountains, *Horner* 367; *Lake & Hull* 639; *Piper*, July 17, 1896.

ZONAL DISTRIBUTION: Canadian.

9. Mertensia leptophylla sp. nov.

Stems glabrous, stout, erect, a meter or more high; leaves ovate, acute, pilose beneath, glabrous above, ciliate, very thin, the blades 6 to 10 cm. long, all on margined petioles 1 to 3 cm. long; infloresence loose; pedicels with spreading pubescence; calyx parted nearly to base, the lobes narrowly triangular-lanceolate, acute, ciliate, smooth on the back; corolla blue, about 12 mm. long, the slightly enlarged throat as long as the tube; filaments dilated, shorter than the anthers.

Known only from the Olympic Mountains of Clallam County, the type collected by Elmer, no. 2826, July 1900, sheet no. 402139 in the U. S. National Herbarium. The plant was also collected on Mount Storm King by Lawrence, no. 359, July 23, 1904.

10. Mertensia pulchella sp. nov.

Stems erect, solitary or rarely two, glabrous, 15 to 20 cm. high; tubers shallow-seated, simple or fasciculate-branched, black; leaves green, elliptic or ovate, mostly obtuse, thickish, glabrous beneath, more or less papillose above, scabrous-ciliate, the lower narrowed at base and short-petioled, the middle and upper ones ovate, sessile, often half-clasping, 2 to 10 cm. long; lowest leaves much reduced, scarious; flowers in a close cluster, usually 10 to 15; calyx parted nearly to the base, the lobes oblong-lanceolate very acute, denticulate; corolla blue, its tube three to four times as long as the calyx and nearly as broad as the ampliate limb; filaments dilated, as long as the anthers; nutlets small, dark gray, finely muriculate, attached by a pale and prominent scar, inclosed in the tube of the much enlarged fruiting calyx.

The following collections have been examined:

Idaho: On the lower Clearwater River, *Sandberg, Heller, & MacDougal*, 75 and 75a, April 30, 1892 (type sheet in U. S. National Herbarium, no. 213037); without locality, *Rev. G. Ainslee* in 1871; *Henderson*, April 21, 1894; Lake Waha, Nez Perces County, *Heller*, June 2, 1896; Lewiston, *Byron Hunter*, 11, March 31, 1900.

All the above specimens are from Idaho, close to the Washington line, so that the species doubtless occurs within our limits.

10a. Mertensia pulchella glauca subsp. nov.

Herbage slightly glaucous throughout; leaves narrower, usually elliptic, mostly narrowed at base; stems often 2 to 4 from the same tuber; corolla tube more slender.

SPECIMENS EXAMINED: Hills west of Wenache, *Whited* 1010, March 31, 1899; type sheet no. 366511 in the U. S. National Herbarium; Badger Mountain, *Whited*, May 24, 1900.

This may well prove a distinct species, but in the light of rather scanty material is considered too close to *M. pulchella*.

11. Mertensia oblongifolia (Nutt.) G. Don, Hist. Dichl. Pl. **4**: 372. 1838.

Pulmonaria oblongifolia Nutt. Journ. Acad. Phila. **7**: 43. 1834.

Mertensia longiflora Greene, Pittonia **3**: 261. 1898.

TYPE LOCALITY: "Towards the sources of the Columbia River." Collected by Wyeth.

RANGE: Washington, Idaho, Montana.

SPECIMENS EXAMINED: Fort Colville, *Lyall* in 1861; Upper Columbia, *Geyer* 316; Cheney, *Mrs. Susan Tucker* in 1890; Hangman Creek, *Sandberg & Leiberg* 48; Spokane, *Lyall* in 1861; *Henderson* in 1892; Wenache, *Whited* 1010; Pullman, *Piper* 1875; Almota, *Piper*, April 7, 1894; without locality, *Vasey* in 1883.

12. Mertensia horneri sp. nov.

Stems 8 to 15 cm. high, glabrous, solitary or rarely 2 or 3, erect from a shallow-seated oblong, black tuber; basal leaves none; cauline 2 to 5, oblong, obtuse, pale and somewhat glaucous, appressed puberulent above, glabrous beneath, sessile, or the lower ones short-petioled, 2 to 3 cm. long; lowest leaves reduced and scarious; inflorescence close; calyx glaucous, parted nearly to the base, its lobes oblong-lanceolate, very acute, denticulate-ciliate on the margin; corolla blue, 10 to 12 mm. long, its tube about twice as long as the calyx; filaments dilated, as long as the anthers.

SPECIMENS EXAMINED: Waitsburg, Washington, *Prof. R. M. Horner* 366, April 3, 1897, the type in the U. S. National Herbarium, sheet no. 318875; Union County, Oregon, *Cusick*, 1830, April 13, 1898.

13. Mertensia pubescens sp. nov.

Tufted from a stout vertical caudex covered with the dead bases of old leaves; stems 10 to 15 cm. high, leafy to the top; leaves numerous, the cauline inclined to be secund, linear or linear-lanceolate, obtuse or acutish, only the midrib evident, 3 to 6 cm. long, mostly about 5 mm. wide, pubescent on both surfaces, the basal ones attenuate into margined petioles about as long as the blades, the cauline sessile and but little reduced upwards; panicle short, dense, nodding; calyx lobes lanceolate, acute, coarsely ciliate, glabrous on the back, a third to a fourth as long as the corolla tube; corolla blue, the narrow tube 6 to 8 mm. long, one-half longer than the campanulate limb; filaments dilated, as long as the anthers.

Collected near Waterville, Douglas County, by ***Kirk Whited***, 1214, April 23, 1900, the type sheet in the U. S. National Herbarium no. 370326.

Closely allied to *M. amoena* A. Nelson and *M. bakeri* Greene, but distinguished by its narrow more pubescent leaves and longer corollas.

14. Mertensia nutans Howell, Fl. N. W. Am. 491. 1901.

TYPE LOCALITY: "On the north side of high ridges, eastern Oregon and Washington." The type specimen is from Klickitat County, Washington.

RANGE: Washington and Oregon to Idaho and ? Colorado.

SPECIMENS EXAMINED: Near Granddalles, *Gorman*, April 20, 1892; Klickitat County, *Howell*, May, 1880; Wenache, *Whited* 1034; Ellensburg, *Whited*, April 18, 1897.

ZONAL DISTRIBUTION: Arid Transition.

14a. Mertensia nutans subcalva subsp. nov.

Leaves minutely strigose above; otherwise as in *M. nutans*.

SPECIMENS EXAMINED: Rattlesnake Mountains, *J. S. Cotton*, 328, April 29, 1901.

MERTENSIA MARITIMA (L.) S. F. Gray, Nat. Arr. Br. Pl. 2: 354. 1821. (*Pulmonaria maritima* L. Sp. Pl. 1: 136. 1753.)

This species is said by A. Gray[a] to occur on the coast of Washington, and it is included in Suksdorf's list. There are, however, no specimens in any of the American herbaria to substantiate the statement.

ERITRICHIUM.

1. **Eritrichium howardi** (A. Gray) Rydberg, Mem. N. Y. Bot. Gard. 1: 327. 1900.

Omphalodes howardi A. Gray, Proc. Am. Acad. 20: 263. 1885.

Cynoglossum howardi A. Gray, Syn. Fl. 2^1: 188. 1878.

TYPE LOCALITY: Rocky Mountains in Montana.

RANGE: Washington to Montana and Wyoming.

SPECIMENS EXAMINED: Cascade Mountains, *Tweedy* 130.

AMSINCKIA.

Nutlets not muriculate, the projections smooth and pavement-like; calyx lobes oblong, obtuse .... 1. *A. tessellata.*
Nutlets muriculate-scabrous.
  Erect; calyx lobes linear .... 2. *A. intermedia.*
  Spreading; calyx lobes lanceolate or ovate, two or three of them often united .... 3. *A. lycopsoides.*

1. **Amsinckia tessellata** A. Gray, Proc. Am. Acad. 10: 54. 1874.

TYPE LOCALITY: "Contra Costa mountains near Monte Diablo," California.

RANGE: Washington to Utah and California.

SPECIMENS EXAMINED: Wenache, *Whited*, June, 1896 and 44; Ellensburg, *Piper*, May 20, 1897; North Yakima, *Piper* 2785; *Henderson* 2558; Pasco, *Piper* 2971, 2977; *Hindshaw* 20; Snipes Mountain, *Cotton* 312; Coulee City, *Piper* 3847; Ephrata to Ritzville, *Griffiths & Cotton* 489.

ZONAL DISTRIBUTION: Upper Sonoran.

2. **Amsinckia intermedia** Fisch. & Mey. Ind. Sem. Hort. Petrop. 2: 26. 1835.

Eutoca menziesii Lehm. Pug. 2: 29. 1830, not R. Br. 1823.

TYPE LOCALITY: "Hab. cum sequente specie circa coloniam ruthenorum Ross in portu Bodega Novae Californiae."

RANGE: Washington and Idaho to California and Nevada.

SPECIMENS EXAMINED: San Juan Island, *Lyall*, May 10, 1858; Fairhaven, *Piper*, July 2, 1897; Port Ludlow, *Binns;* Ellensburg, *Piper* 2699; west Klickitat County, *Suksdorf* 994, 2007, 390, 995; Rock Lake, *Sandberg & Leiberg* 120; Douglas County, *Spillman;* Waitsburg, *Horner* 146, 147; Blue Mountains, *Piper;* Pullman, *Hull* 638; *Elmer;* Almota *Piper* 2786; Wawawai, *Piper* 1838; Colfax, *Piper;* without locality, *Vasey* in 1889; Meyers Falls, *Kreager* 479.

ZONAL DISTRIBUTION: Upper Sonoran and Arid Transition.

An exceedingly troublesome weed in grain fields of southeastern Washington, locally known as "tarweed." The species is extremely variable and Suksdorf segregates from it three proposed new species, *A. arenaria*,[b] *A. retrorsa*,[c] and *A. micrantha*.[c] The characters relied upon seem very slight and we question their value.

3. **Amsinckia lycopsoides** Lehm.; DC. Prod. 10: 117. 1846.

Lithospermum lycopsoides Lehm. Pug. 2: 28. 1830.

Amsinckia lycopsoides bracteosa A. Gray, Syn. Fl. 2^1: 198. 1878.

TYPE LOCALITY: "Straits of De Fuca, Scouler" according to Hooker.

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[a] Syn. Fl. 2: 200, 1878. [b] Deutsch. Bot. Monatss. 18: 133. 1900. [c] Op. cit. 134.

RANGE: Vancouver Island to California.

SPECIMENS EXAMINED: Fairhaven, *Suksdorf* 996; Puget Sound, *Suckley;* Port Ludlow, *Binns*, September 25, 1890; Clallam County, *Elmer* 2754; Fairhaven, *Piper*, July 3, 1897; Spokane, *Piper* 2275; without locality, *Cooper* in 1854.

ZONAL DISTRIBUTION: Humid Transition.

The two forms distinguished by Doctor Gray are probably worthy of recognition, but unfortunately his subspecies *bracteosa* is clearly based on the original *Lithospermum lycopsoides*.

PIPTOCALYX.

1. **Piptocalyx circumscissus** (Hook. & Arn.) Torr. Bot. Wilkes Exped. **17**: 414. 1874.

Lithospermum? circumscissum Hook. & Arn. Bot. Beech. Voy. 370. 1840.

Echinospermum circumscissum A. Gray, Proc. Am. Acad. **10**: 58. 1875.

TYPE LOCALITY: "Snake Fort, Snake Country," Idaho. Collected by Tolmie.

RANGE: Washington to Wyoming, Utah, and California.

SPECIMENS EXAMINED: Morgans Ferry, *Suksdorf* 404; Sunnyside, *Cotton* 351; North Yakima, *Henderson*, May 26, 1892; Pasco, *Piper* 2966; *Hindshaw* 30; Ainsworth, *Brandegee* 991; Wilson Creek, *Sandberg & Leiberg* 228.

ZONAL DISTRIBUTION: Upper Sonoran.

OREOCARYA.

Corolla tube exceeding the calyx.. 1. *O. leucophaea.*
Corolla tube not exceeding the calyx.
  Herbage not very hispid, but decidedly canescent and the inflorescence fulvescent.. 4. *O. sericea.*
  Herbage very hispid; inflorescence not fulvescent.
    Inflorescence very dense; leaves obtuse........................ 2. *O. celosioides.*
    Inflorescence not very dense; leaves acute.................... 3. *O. spiculifera.*

1. **Oreocarya leucophaea** (Dougl.) Greene, Pittonia **1**: 58. 1887.

Myosotis leucophaea Dougl.; Lehm. Pug. **2**: 22. 1830.

Eritrichium leucophaeum A. DC. Prod. **10**: 129. 1846.

Krynitskia leucophaea A. Gray, Syn. Fl. ed. 2. **2^1**: 430. 1886.

TYPE LOCALITY: "Arid barrens of the Columbia, and of its northern and southern tributaries." Collected by Douglas.

RANGE: British Columbia to California and Utah.

SPECIMENS EXAMINED: Columbia River, latitude 46° to 49°, *Lyall* in 1860; Morgans Ferry, *Suksdorf* 407; arid barrens of the Columbia, *Douglas;* Egbert Springs, *Sandberg & Leiberg* 93, 373; Scott, *Leckenby*, May 16, 1898; Pasco, *Piper*, July 11, 1897; *Hindshaw* 2; *Elmer* 1056; *Piper* 2987; Walla Walla region, *Brandegee* 997; Wallula, *Cotton* 1027.

ZONAL DISTRIBUTION: Upper Sonoran.

2. **Oreocarya celosioides** Eastwood, Bull. Torr. Club **30**: 240. 1903.

TYPE LOCALITY: "From the banks of the Columbia, eastern Washington." Collected by Howell.

RANGE: Eastern Washington.

SPECIMENS EXAMINED: Rock Island, *Sandberg & Leiberg* 440; Rattlesnake Mountains, *Cotton* 359; near Columbus, *Suksdorf*, June 10, 1886; Klickitat, *Howell*, June, 1879; without locality, *Brandegee* 996.

ZONAL DISTRIBUTION: Arid Transition.

This species has been confused with *O. glomerata* (Pursh) Greene.

3. **Oreocarya spiculifera** sp. nov.

Tufted from a stout woody caudex, the whole plant pallid; basal leaves numerous, crowded, spatulate-oblanceolate, acute, only the midnerve evident, densely pubescent on both sides with fine appressed hairs, scattered among these and on the margins tout hyaline bristles; blades 1.5 to 2 cm. long, exceeding the margined petioles; cauline leaves few, similar to the basal ones, but with shorter petioles; flowering stems erect, simple, 20 to 30 cm. high, angled, pubescent like the leaves; inflorescence of 8 to 12 alternate, subequal, false racemes, floriferous to their bases, the bracts and calyx pubescent like the leaves, but the bristles more abundant; bracts linear-lanceolate, obtuse, shorter than the calyx; pedicels short, soft-hairy; calyx lobes lanceolate, in flower 5 to 6 mm., in fruit 8 mm. long; corolla white, salver-form, its tube 5 mm. long, its limb 8 mm. broad; appendages triangular-ovate, obtuse, short; nutlets pale brown, dull, ovate, obtuse, 3 mm. long, each with a smooth, narrow margin, the back bluntly tuberculate, the ventral side rugose, the groove reaching nearly to the apex; gynobase longer than the nutlets.

Type in the National Herbarium, collected at Ritzville, Adams County, by Sandberg & Leiberg (no. 161), June 6, 1893.

4. **Oreocarya sericea** (A. Gray) Greene, Pittonia **1**: 58. 1887.

Krynitskia sericea A. Gray, Proc. Am. Acad. **20**: 279. 1885.

Type locality: "Alpine and subalpine on the mountains from Colorado and Utah to Oregon and Montana and probably in the British Possessions."

Range: Washington to Montana, Colorado, and California.

Specimens examined: Wenache, *Whited* 1099; Spokane, *Piper* 2294; *Henderson* 2563.

Zonal distribution: Arid Transition.

PECTOCARYA.

Nutlets oblong, the wings undulate .... 1. *P. penicillata.*
Nutlets obovate, the wings entire or wanting.
  Nutlets with a thin scarious wing .... 2. *P. setosa.*
  Nutlets wingless .... 3. *P. pusilla.*

1. **Pectocarya penicillata** (Hook. & Arn.) A. DC. Prod. **10**: 120. 1846.

Cynoglossum penicillatum Hook. & Arn. Bot. Beech. Voy. 371. 1840.

Type locality: California.

Range: British Columbia to California and Nevada.

Specimens examined: Wenache, *Whited* 86; North Yakima, *Henderson*, May 27, 1892; Pasco, *Piper* 2967; Douglas County, *Spillman*, May 27, 1896; Harrington, *Sandberg & Leiberg* 223; Coulee City, *Piper* 3869; Walla Walla region, *Brandegee* 984; Rattlesnake Mountains, *Griffiths & Cotton* 22.

Zonal distribution: Upper Sonoran and Arid Transition.

2. **Pectocarya setosa** A. Gray, Proc. Am. Acad. **12**: 81. 1877.

Type locality: "On the desert plains of the upper Mohave River," California.

Range: Washington to California.

Specimens examined: Yakima County, *Brandegee* 985; North Yakima, *Henderson* 2560.

Zonal distribution: Upper Sonoran.

3. **Pectocarya pusilla** (A. DC.) A. Gray, Proc. Am. Acad. **12**: 81. 1877.

Gruvelia pusilla A. DC. Prod. **10**: 119. 1846.

Type locality: "In Chili prope Valparaiso et montem la Leona."

Range: Washington to California. Chile.

Specimens examined: West Klickitat County, *Suksdorf* 410.

PLAGIOBOTHRYS.

Nutlets somewhat cruciform, muriculate .... 1. *P. tenellus.*
Nutlets ovate, carinate, dull, roughened .... 2. *P. nothofulvus.*

1. **Plagiobothrys tenellus** (Nutt.) A. Gray, Proc. Am. Acad. **20**: 283. 1885.

Myosotis tenella Nutt.; Hook. Kew. Journ. Bot. **3**: 295. 1851.

Plagiobothrys asper Greene, Pittonia **3**: 262. 1898.

Type locality: "Sunny rocky slopes of the mountains along the Coeur d'Alene River," Idaho. Collected by Geyer.

Range: British Columbia to Idaho and California.

Specimens examined: San Juan Island, *Lyall* in 1858; Orcas Island, *Lyall* in 1858; Fort Vancouver, *Tolmie;* Wenache, *Whited* 1046; Spokane Valley, *Lyall* in 1861; Spokane, *Piper; Henderson; Sandberg & Leiberg* 10; Walla Walla region, *Brandegee* 990; near Waitsburg, *Horner* 160; Wawawai, *Piper; Elmer* 767; without locality, *Vasey* in 1889.

Zonal distribution: Upper Sonoran and Arid Transition.

2. **Plagiobothrys nothofulvus** A. Gray, Proc. Am. Acad. **20**: 285. 1885.

Eritrichium nothofulvum A. Gray, Proc. Am. Acad. **17**: 227. 1882.

Type locality: California.

Range: Washington to California.

Specimens examined: West Klickitat County, *Suksdorf* 37.

CRYPTANTHE.

- Nutlets with scarious crenate wings .... 1. *C. pterocarya.*
- Nutlets not winged.
  - Surface of nutlets smooth and shining.
    - Nutlets solitary or rarely two, narrow, attenuate-acuminate.
      - Ventral groove simple, elongated at base .... 2. *C. flaccida.*
      - Ventral groove bifurcate at base .... 3. *C. suksdorfii.*
    - Nutlets four, ovate, acute or short-acuminate.
      - Ventral groove simple to the base .... 4. *C. affinis.*
      - Ventral groove forked at base.
        - Pubescence setose, spreading .... 5. *C. ramulosissima.*
        - Pubescence somewhat appressed .... 6. *C. torreyana.*
  - Surface of nutlet rough.
    - Calyx twice as long as the acuminate nutlets .... 7. *C. ambigua.*
    - Calyx little longer than the acute nutlets .... 8. *C. muriculata.*

1. **Cryptanthe pterocarya** (Torr.) Greene, Pittonia **1**: 120. 1887.

Eritrichium pterocaryum Torr. Bot. Mex. Bound. 142. 1859.

Krynitskia pterocarya A. Gray, Proc. Am. Acad. **20**: 276. 1885.

Type locality: "Near El Paso," Texas.

Range: Washington to California and Texas.

Specimens examined: Ellensburg, *Hindshaw*, May, 1896; Yakima, *Henderson* in 1892; Pasco, *Hindshaw*, May 25, 1896 and no. 41; *Piper* 2961; Coulee City, *Piper* 3881; Wilson Creek, *Sandberg & Leiberg* 260; Walla Walla region, *Brandegee* 995; without locality, *Vasey* in 1889.

Zonal distribution: Upper Sonoran.

2. **Cryptanthe flaccida** (Lehm.) Greene, Pittonia **1**: 115. 1887.

Myosotis flaccida Lehm. Pug. **2**: 22. 1830.

Eritrichium oxycaryum A. Gray, Proc. Am. Acad. **10**: 58. 1874.

Krynitskia oxycarya A. Gray, Syn. Fl. **2**^{1}: 425. 1878.

Type locality: "N. W. Coast in dry plains." Collected by Douglas.

Range: Washington and Idaho to California.

Specimens examined: Yakima, *Henderson* in 1892; Coulee City, *Piper* 3887; Crab and Wilson creeks, *Sandberg & Leiberg* 304; Sprague, *Sandberg & Leiberg* 173; without locality, *Brandegee* 992; Almota, *Piper* 1702; Waitsburg, *Horner* 602, 144; Wawawai, *Lake & Hull* 820; *Elmer* 766.

Zonal distribution: Upper Sonoran.

3. **Cryptanthe suksdorfii** (Greenman).

Krynitskia sukskorfii Greenman, Bot. Gaz. 40: 146. 1905.

Type locality: "On dry hillsides near Rockland, Klichitat County," Washington. Collected by Suksdorf.

Range: Washington and Oregon.

Specimens examined: Rockland, *Suksdorf*, June 8, 1904.

4. **Cryptanthe affinis** (A. Gray) Greene, Pittonia 1: 119. 1887.

Krynitskia affinis A. Gray, Proc. Am. Acad. 20: 270. 1885.

Type locality: "E. side of the Cascades near Lat. 49°." Collected by Lyall in 1860.

Range: Washington and Idaho to California.

Specimens examined: Cascade Mountains, latitude 49°, *Lyall* in 1860; Falcon Valley, *Suksdorf* 455; Klickitat River, *Flett* 1197; Cascade Mountains, Yakima County, *Henderson*; Kamiak Butte, *Piper* 3092; Blue Mountains, *Piper*, July 15, 1896; Waitsburg, *Horner* 603; along Touchet River, *Horner* 381.

Zonal distribution: Arid Transition.

5. **Cryptanthe ramulosissima** A. Nelson, Erythea 7: 68. 1899.

Type locality: Laramie, Wyoming.

Range: Washington and Wyoming.

Specimens examined: Pasco, *Elmer* 1054; *Piper* 2750 and 2951; *Henderson* 2562; Rattlesnake Mountains, *Griffiths & Cotton* 24.

Zonal distribution: Upper Sonoran.

6. **Cryptanthe torreyana** Greene, Pittonia 1: 118. 1887.

Krynitzkia torreyana A. Gray, Proc. Am. Acad. 20: 271. 1885.

Krynitzkia leiocarpa Fisch. & Mey. err. det. Torr. Bot. Mex. Bound. 142. 1859.

Type locality: Grassy hills near San Luis Rey, California, according to label on type specimen.

Range: Washington to Nevada and California.

Specimens examined: Coulee City, *Piper* 3882.

6a. **Cryptanthe torreyana calycosa** Greene, Pittonia 1: 119. 1887.

Krynitskia torreyana calycosa A. Gray, Proc. Am. Acad. 20: 271. 1885.

Type locality: "E. Humboldt Mountains, Nevada." Collected by Watson.

Range: Washington and Montana to California and Nevada.

Specimens examined: Ellensburg, *Whited* 506; *Piper*, July 9, 1897; North Yakima, *Henderson*, May 29, 1892; Falcon Valley, *Suksdorf* 593; Crab and Wilson creeks, *Sandberg & Leiberg* 249; Spangle, *Piper*, June 24, 1899; Spokane, *Piper*, July 6, 1895, 1943; *Henderson*, June 1, 1892; Pullman, *Piper* 1942, 1945; Wawawai, *Lake*, June 4, 1892; *Piper*, 1944, 3813, 1941; along Tukanon River, *Lake & Hull* 821; Kamiak Butte, *Piper* 3091.

Zonal distribution: Arid Transition and Upper Sonoran.

There are two forms of this subspecies, one with small corollas and one with large. No other character seems to be associated with this difference, however.

7. **Cryptanthe ambigua** (A. Gray) Greene, Pittonia 1: 113. 1887.

Krynitskia ambigua A. Gray, Proc. Am. Acad. 20: 273. 1885.

Eritrichium muriculatum Torr. Bot. Wilkes. Exped. 17: 416. *pl. 13.* 1874.

Cryptanthe monosperma Greene, Pittonia 5: 53. 1902.

Type locality: Nisqually, Washington.

Range: Washington to Montana and California.

Specimens examined: Klickitat *Howell* 337; north of Bickleton, *Suksdorf* 406; without locality, *Brandegee* 994; Falcon Valley, *Suksdorf* 46, 595.

8. **Cryptanthe muriculata** (A. DC.) Greene, Pittonia 1: 113. 1887.

Eritrichium muriculatum A. DC. Prod. 10: 132. 1846.

Krynitskia muriculata A. Gray, Proc. Am. Acad. 20: 273. 1885.

Myosotis muricata Hook. & Arn. Bot. Beech. Voy. 369. 1840, not *Lithospermum muricatum* Ruiz & Pavon, 1799.

Allocarya hendersoni A. Nelson, Erythea 7: 69. 1899.

TYPE LOCALITY: California.

RANGE: Washington and Idaho to California.

SPECIMENS EXAMINED: Mason County, *Kincaid,* May 16, 1892; Tacoma, *Flett* 896; Olympia, —— July 4, 1896; Steilacoom, *Piper,* May 27, 1888; Fourth Plain, *Piper* 3083; Vancouver, *Tolmie;* Falcon Valley, *Suksdorf* 456; Clealum, *Henderson,* June 11, 1892; Palouse, *Cloud,* June, 1895; Goat Mountains, *Flett* 2156; Cape Horn, *Piper* 5018; Pullman, *Elmer* 155.

Suksdorf lists under Krynitskia two additional species, *Cryptanthe leiocarpa* (Fisch. & Mey.) Greene and *C. fendleri* (A. Gray) Greene. There is no evidence in the Gray Herbarium that the former occurs in Washington, though Doctor Gray included this State in its range, nor have we seen specimens elsewhere. The Wilkes Expedition plant referred to *C. leiocarpa* by Torrey is *C. torreyana calycosa,* collected near Spokane. Suksdorf's specimen on the basis of which *C. fendleri* is included in his list seems to be *C. ambigua.*

ALLOCARYA.

Corolla small, 1 to 2 lines broad; branches prostrate.
  Nutlets transversely rugose, not bristly........................ 1. *A. hispidula.*
  Nutlets transversely rugose and bristly........................ 2. *A. subglochidiata.*
Corolla large, 3 to 5 lines broad; stems erect or ascending.
  Nutlets rugulose, granulate, not stipitate........................ 3. *A. scouleri.*
  Nutlets rugulose, granulate, stipitate........................ 4. *A. stipitata.*

1. **Allocarya hispidula** Greene, Pittonia 1: 17. 1887.

TYPE LOCALITY: San Bernardino Mountains, California.

RANGE: Washington and Idaho to California.

SPECIMENS EXAMINED: Klickitat County, *Howell* 295; near Mount Adams, *Henderson;* Falcon Valley, *Suksdorf* 2113; Ellensburg, *Whited* 863; Bingen, *Suksdorf* 2207; Kettle Falls, *Watson* 284; Crab Creek, *Suksdorf* 403; Harrington, *Sandberg & Leiberg* 217; Spokane, *Savage* 20; Waitsburg, *Horner* 138; without locality, *Vasey* in 1889; Pullman, *Piper,* July 20, 1894, 1701, 3022.

ZONAL DISTRIBUTION: Arid Transition.

A close ally of *A. californica,* with which it has often been included.

2. **Allocarya subglochidiata** (A. Gray).

Allocarya humistrata Greene, Pittonia 1: 16. 1887.

Eritrichium californicum subglochidiatum A. Gray, Bot. Cal. 1: 526. 1876.

TYPE LOCALITY: "Placer to Sierra Co.," California.

RANGE: Washington to California.

SPECIMENS EXAMINED: North Yakima, *Henderson,* June 13, 1892; Wilson Creek, *Lake & Hull,* August 6, 1892.

ZONAL DISTRIBUTION: Upper Sonoran.

3. **Allocarya scouleri** (Hook. & Arn.) Greene, Pittonia 1: 18. 1887.

Myosotis scouleri Hook. & Arn. Bot. Beech. Voy. 370. 1840.

Eritrichium ? scouleri A. DC. in DC. Prod. 10: 130. 1846.

Krynitskia scouleri A. Gray, Proc. Am. Acad. 20: 267. 1885.

TYPE LOCALITY: "Columbia River."

RANGE: Washington to California in the coast region.

SPECIMENS EXAMINED: Succotash Valley, *Piper* in 1895; Klickitat County, *Suksdorf* 45; *Howell* 336; Seattle, *E. S. Meany* 531; Clallam County, *Elmer* 2753, 2756.

ZONAL DISTRIBUTION: Humid Transition.

A specimen collected by Suksdorf May 26, 1881, in Western Klickitat County I would refer to *A. scouleri*, but Professor Greene regards it as belonging to his *Allocarya hirta*.[a]

4. Allocarya stipitata Greene, Pittonia 1: 19. 1887.

Type locality: "In the central part of California."

Range: Washington to California in the coast region.

Specimens examined: Clallam County, *Elmer* 2755; Tacoma, *Flett* 2, 879; Mason County, *Piper* 1053.

Zonal distribution: Humid Transition.

MYOSOTIS. Forget-me-not.

Perennial: calyx hairs straight: corolla blue.......................... 1. *M. laxa*.
Annual: calyx hairs hooked: corolla white.......................... 2. *M. macrosperma*.

1. Myosotis laxa Lehm. Asper. 83. 1818.

Type locality: "Habitat in America septentrionale."

Range: Canada to Virginia and Tennessee; Washington and Oregon.

Specimens examined: Whatcom, *Gardner* 415; Walla Walla, *Savage* 3; Wenache, *Whited* 1362.

Zonal distribution: Transition.

2. Myosotis macrosperma Engelm. Am. Journ. Sci. I. 46: 98. 1844.

Type locality: Texas.

Range: Washington to New England, southward to California, Texas, and Florida.

Specimens examined: Whidby Island, *Gardner* 215; Seattle, *Piper* 618; White Salmon, *Suksdorf* 295; Spokane, *Henderson*, May 31, 1892; Walla Walla Region, *Brandegee* 1000; Copper River, *Horner* 149; Waitsburg, *Horner* 600; Mount Carlton, *Kreager* 158.

Zonal distribution: Transition.

This species seems amply distinct from *M. verna* Nutt., to which it is commonly referred.

LITHOSPERMUM.

1. Lithospermum ruderale Dougl., Lehm. Pug. 2: 28. 1830.

? *Lithospermum pilosum* Nutt. Journ. Acad. Phil. 7: 43. 1834.

Lithospermum lanceolatum Rydberg. Mem. N. Y. Bot. Gard. 1: 333. 1900.

Type locality: "Gravelly banks of the Columbia and Multnomah Rivers." Collected by Douglas.

Range: British Columbia to Montana, Utah, and California.

Specimens examined. Wenache, *Whited* 1060, Rattlesnake Mountains, *Cotton* 358; North Yakima, *Leckenby*, May 1898, *Flett* 1035, Whidby Island, *Gardner* 213, west Klickitat County, *Suksdorf* 166, Ritzville, *Sandberg & Leiberg*, June, 1893, Rock Creek, *Sandberg & Leiberg* 128, Colville, *Lyall* in 1861; Walla Walla, *Lyall* in 1860, without locality, *Vasey* in 1889, Pullman, *Elmer* 212; *Hull* 640, *Piper* 1700, 1699, Wawawai, *Lake & Hull* 640, Clarks Springs, *Kreager* 69; Ione, *Kreager* 402, Colville Reservation, *Griffiths & Cotton* 406.

Zonal distribution: Arid Transition.

MENTHACEAE. Mint Family.

Ovary 4-lobed.
  Corolla nearly regular, 5-cleft .... Trichostema (p. 487).
  Corolla very irregular, apparently 1-lipped .... Teucrium (p. 487).
Ovary 4-parted.
  Corolla distinctly bilabiate, the upper lip concave.
    Antheriferous stamens 2........................ Ramona (p. 488).
    Antheriferous stamens 4.
      Calyx with a protuberance on the upper side..... Scutellaria (p. 488).
      Calyx without protuberance.

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[a] Pittonia 1: 161. 1888.

- Upper pair of stamens longer than the lower.
  - Anther cells parallel .... AGASTACHE (p. 489)
  - Anther cells divergent.
    - Calyx teeth subequal .... NEPETA (p. 489).
    - Calyx teeth unequal, the upper very large .... DRACOCEPHALUM (p. 489).
- Upper pair of stamens shorter than the lower.
  - Calyx bilabiate .... PRUNELLA (p. 489).
  - Calyx not bilabiate.
    - Teeth of the calyx 10, spiny ...... MARRUBIUM (p. 489).
    - Teeth of the calyx 5, not spiny.
      - Flowers opposite; calyx becoming inflated .... PHYSOSTEGIA (p. 490).
      - Flowers whorled; calyx not becoming inflated.
        - Throat of corolla dilated . LAMIUM (p. 490).
        - Throat of corolla not dilated .... STACHYS (p. 490).
- Corolla nearly regular, or when bilabiate, the upper lip plane.
  - Corolla regular or nearly so.
    - Antheriferous stamens 2 .... LYCOPUS (p. 491).
    - Antheriferous stamens 4 .... MENTHA (p. 492).
  - Corolla bilabiate.
    - Plant creeping; flowers axillary .... MICROMERIA (p. 493).
    - Plant erect; flowers capitate-verticillate .... MADRONELLA (p. 493.)

TRICHOSTEMA.

Corolla tube not exceeding the calyx; leaves membranaceous, costate-veined .... *1. T. oblongum.*

Corolla tube slender, exserted; leaves crowded, strongly 3 to 5-nervose. *2. T. lanceolatum.*

1. **Trichostema oblongum** Benth. Lab. 659. 1832–36.

TYPE LOCALITY: "In herbidis prope arcem Vancouver." Collected by Douglas.

RANGE: Washington and Idaho to California.

SPECIMENS EXAMINED: Falcon Valley, *Suksdorf* 34; without locality, *Douglas;* Pullman *Piper* 1874; *Hull,* July 16, 1892.

ZONAL DISTRIBUTION: Arid Transition.

2. **Trichostema lanceolatum** Benth. Lab. 659. 1835–36.

TYPE LOCALITY: "Prope arcem Vancouver in siccis ad flumen Multnomah et in Nova California." Collected by Douglas.

RANGE: California, Oregon, Washington?

It is very doubtful if this plant occurs north of the Columbia River. The above statement of Douglas in Hooker's Flora is the only direct evidence.

TEUCRIUM.

1. **Teucrium occidentale** A. Gray, Syn. Fl. 2^1: 349. 1878.

TYPE LOCALITY: Nebraska. Collected by Hayden.

RANGE: Washington to California, New Mexico, and Nebraska.

SPECIMENS EXAMINED: Coulee City, *Henderson* 2533; Toppenish, *Griffiths & Cotton* 769.

1a. **Teucrium occidentale viscidum** subsp. nov.

Differs from *T. occidentale* in being viscid-pubescent throughout.

Collected at Mission, Stevens County, in muck land, August 22, 1902, by Frank O. Kreager (no. 482). The type is the sheet in the U. S. National Herbarium no. 441297.

RAMONA.

1. **Ramona incana** (Benth.) Dougl.; Briquet, Bull. Herb. Boiss. 2: 440, 1894.
Audibertia incana Benth. Bot. Reg. 17: *pl. 1469.* 1831.
Salvia carnosa Dougl. loc. cit. as synonym.

TYPE LOCALITY: "On the plains of the Columbia, near the Priest's Rapid, and on the clayey hills near the Big Birch, in 1826." Collected by Douglas.

RANGE: Washington and Idaho to Arizona.

SPECIMENS EXAMINED: Wenache, *Whited* 1066; Ellensburg, *Elmer* 110; North Yakima, *Mrs. Steinweg* in 1894; *Flett* 1029; *Henderson*, May 21, 1892; *Piper*, July 10, 1897; *Watt* August, 1895; Yakima River, *Suksdorf* 428; Egbert Springs, *Sandberg & Leiberg* 362; Rattlesnake Mountains, *Cotton* 467; Snipes Mountain, *Cotton* 388; Columbia Valley, *Lyall* in 1860; Crab Creek, *Sandberg & Leiberg* 244; Douglas County, *Spillman*, May 27, 1890; Coulee City, *Lake & Hull*, August 8, 1892; Loon Lake, *Winston*, July 20, 1897; Soap Lake, *McKay* 9; Spokane, *Henderson*, July 9, 1892; *Leiberg* 60.

ZONAL DISTRIBUTION: Upper Sonoran.

SCUTELLARIA. SKULLCAP.

Flowers small in axillary or terminal racemes........................ 1. *S. lateriflora*.
Flowers larger, solitary in the leaf axils.
  Lower lip of corolla not villous.................................. 2. *S. galericulata*.
  Lower lip of corolla villous within.
    Corolla 14 to 20 mm. long; leaves oblong, obtuse at each end.. 3. *S. antirrhinoides*.
    Corolla 16 to 25 mm. long; upper leaves linear or narrow, acute at base.. 4. *S. angustifolia*.

1. **Scutellaria lateriflora** L. Sp. Pl. 2: 598. 1753.

TYPE LOCALITY: "Habitat in Canada, Virginia."

RANGE: Temperate North America.

SPECIMENS EXAMINED: Cascade Mountains, latitude 49°, *Lyall*; Whatcom County, *Suksdorf* 1001; Loomis, *Elmer* 612; Seattle, *Piper* in 1885.

ZONAL DISTRIBUTION: Humid Transition.

2. **Scutellaria galericulata** L. Sp. Pl. 2: 599. 1753.

TYPE LOCALITY: European.

RANGE: Alaska to Labrador, southward to Arizona, Nebraska, and North Carolina.

SPECIMENS EXAMINED: Cascade Mountains, latitude 49°, *Lyall* in 1859; Mount Constitution, *Henderson*, July 4, 1892; Falcon Valley, *Suksdorf* 473; Nason Creek, *Sandberg & Leiberg* 619; Mission, *Kreager*, August 21, 1902; Wilbur, *Henderson*, July 12, 1892; Rock Lake, *Lake & Hull*, August, 1892; Marshall Junction, *Piper*, July 2, 1896; Mission, *Kreager* 492.

ZONAL DISTRIBUTION: Transition.

3. **Scutellaria antirrhinoides** Benth. Lab. 440. 1834.

TYPE LOCALITY: "Prope arcem Vancouver ad ripas Columbiae." Collected by Scouler.

RANGE: Oregon, California, Nevada, and ? Washington.

We have seen no Washington specimens of this species, though Fort Vancouver is given as the type locality. All recent Washington specimens referred to *S. antirrhinoides* are *S. angustifolia*.

4. **Scutellaria angustifolia** Pursh, Fl. 2: 412. 1814.

TYPE LOCALITY: "On the river Kooskoosky." Collected by Lewis, the exact spot opposite Kamiah, Idaho.

RANGE: British Columbia to Montana and California.

SPECIMENS EXAMINED: West Klickitat County, *Suksdorf* 54; Naches, *Lyall* in 1860; Douglas County, *Spillman*, May 27, 1896; Spokane, *Henderson*, May, 1892; Pullman, *Lake & Hull* 598; *Piper* 1570; Wawawai, *Lake* 598; Spokane, *Kreager* 10.

ZONAL DISTRIBUTION: Arid Transition.

AGASTACHE.

Leaves green on both sides.. 1. *A. urticifolia.*
Leaves white beneath.. 2. *A. occidentalis.*

1. **Agastache urticifolia** (Benth.) Rydberg, Mem. N. Y. Bot. Gard. **1**: 339. 1900.
Lophantus urticifolius Benth. Bot. Reg. **15**: under *pl. 1282.* 1829.
TYPE LOCALITY: "From the north-west coast of America." Collected by Douglas.
RANGE: Washington and Idaho to Nevada and California.
SPECIMENS EXAMINED: Rattlesnake Mountains, *Suksdorf* 426; Crab Creek, *Suksdorf* 427; Walla Walla, *Lyall* in 1860; Tukanon River, *Lake & Hull* 597; Pullman, *Piper* 1569; Clarks Springs, *Kreager* 142.
ZONAL DISTRIBUTION: Arid Transition.

2. **Agastache occidentalis** (Piper) Heller, Muhlenbergia **1**: 4. 1900.
Vleckia occidentalis Piper, Erythrea **6**: 31. 1898.
TYPE LOCALITY: "Six miles southwest of Ellensburg," Washington. Collected by Elmer.
RANGE: Eastern Washington.
SPECIMENS EXAMINED: Near Wenache, *Whited* 143½, 1296; Ellensburg, *Elmer* 396; Tampico, *Flett* 1040; Egbert Springs, *Sandberg & Leiberg* 353; lower Naches River, *Henderson,* June 13, 1892; Douglas County, *Spillman,* May 27, 1896; Toppenish, *Griffiths & Cotton* 673.
ZONAL DISTRIBUTION: Upper Sonoran.

NEPETA.

1. **Nepeta cataria** L. Sp. Pl. **2**: 570. 1753. CATNIP.
TYPE LOCALITY: European.
SPECIMENS EXAMINED: Pullman, *Hardwick,* July 30, 1895.

DRACOCEPHALUM.

1. **Dracocephalum parviflorum** Nutt. Gen. **2**: 35. 1818.
TYPE LOCALITY: "Around Fort Mandan, on the Missouri." Collected by Nuttall.
RANGE: British Columbia, eastward to Lake Ontario, and in the Rocky Mountains to New Mexico.
SPECIMENS EXAMINED: Stevens Pass, *Sandberg & Leiberg* 800; Pend Oreille, *Lyall* in 1861; Medical Lake, *Henderson.*
ZONAL DISTRIBUTION: Arid Transition.

PRUNELLA.

1. **Prunella vulgaris** L. Sp. Pl. **2**: 600. 1753. HEALALL.
Prunella vulgaris major Hook. Fl. Bor. Am. **2**: 114. 1838.
TYPE LOCALITY: European.
RANGE: Temperate North America. Europe. Asia.
SPECIMENS EXAMINED: Clallam County, *Elmer* 2544; Humptulips, *Lamb* 1205; Muckleshoot, *Dr. Ruhn;* Seattle, *Piper,* July 10, 1895; Silverton, *Bouck* 145; Cascade Mountains, latitude 49°, *Lyall* in 1859; Peshastin, *Sandberg & Lieberg* 541; west Klickitat County, *Suksdorf* 1445; Skamania County, *Suksdorf* 2244; North Yakima, *Watt,* August, 1895; Kettle Falls, *Watson* 332; Tukanon River, *Lake & Hull,* July 1, 1892; Pullman, *Hull* 604; Clarks Springs, *Kreager* 128; Mabton, *Griffiths & Cotton* 570.
ZONAL DISTRIBUTION: Transition and Canadian.

MARRUBIUM.

1. **Marrubium vulgare** L. Sp. Pl. **2**: 583. 1753. HOREHOUND.
TYPE LOCALITY: European.
SPECIMENS EXAMINED: Almota, *Lake & Hull* 596. A common weed in most parts of the State.

PHYSOSTEGIA.

1. **Physostegia parviflora** Nutt; A. Gray, Syn. Fl. **2**^{1}: 383. 1878.

TYPE LOCALITY: "Oregon." Collected by Nuttall.

RANGE: British Columbia and Saskatchewan to Oregon and Wyoming.

SPECIMENS EXAMINED: Cascade Mauntains, latitude 49°, *Lyall* in 1858; Lindsleys, *Henderson*, September 9, 1892; Kettle Falls, *Watson* 333; Chelan, *Elmer* 486; Lake Chelan, *Lake & Hull* 688; Lake Kalispel, *Kreager* 320; Mission, *Kreager* 483.

ZONAL DISTRIBUTION: Transition.

LAMIUM.

1. **Lamium amplexicaule** L. Sp. Pl. **2**: 579. 1753.

TYPE LOCALITY: European.

SPECIMENS EXAMINED: Wawawai, *Piper* 3007.

STACHYS.

Upper leaves sessile, the lower short-petioled........................ 1. *S. palustris.*
Upper leaves not sessile, the lower long-petioled.
  Corolla tube little longer than the calyx, calyx lobes subulate-aristulate........................ 2. *S. bullata.*
  Corolla tube twice as long as the calyx.
    Leaves thick, tomentose and reticulate beneath........................ 3. *S. chamissonis.*
    Leaves thin, not tomentose.
      Corolla 20 mm. long; calyx glabrous or sparsely hirsute; leaves subcordate........................ 4. *S. ciliata.*
      Corolla 12 mm. long; calyx soft-villous; leaves mostly cordate........................ 5. *S. pubens.*

1. **Stachys palustris** L. Sp. Pl. **2**: 580. 1753.

TYPE LOCALITY: European.

RANGE: Temperate North America. Europe. Asia.

SPECIMENS EXAMINED: Cascade Mountains, latitude 49°, *Lyall* in 1859; west Klickitat County, *Suksdorf* 55; Vancouver, *Suksdorf* 2226; Alma, *Elmer* 541; Parker, *Dunn*, August 8, 1901; Coulee City, *Henderson* 2533; Rock Lake, *Lake & Hull* 599; Medical Lake, *Henderson* 2532; Spokane, *Piper;* Union Flat, *Lake & Hull*; Kalispel Lake, *Kreager* 449; Spokane, *Kreager* 541; Mission, *Kreager* 487; Meyers Falls, *Kreager* 471.

ZONAL DISTRIBUTION: Arid Transition.

2. **Stachys bullata** Benth. Lab. 547. 1834.

TYPE LOCALITY: "Hab. in California."

RANGE: Washington to California.

SPECIMENS EXAMINED: Lindsleys, Clarke County, *Henderson* in 1892; Vancouver, *Suksdorf* 2226; Cape Horn, *Suksdorf*, August 19, 1894.

ZONAL DISTRIBUTION: Humid Transition.

3. **Stachys chamissonis** Benth. Linnaea **6**: 80. 1831.

TYPE LOCALITY: California.

RANGE: California to Washington.

SPECIMENS EXAMINED: West Klickitat County, *Suksdorf*, 665, 666, 84.

These specimens are rather intermediate between *ciliata* and *chamissonis*. They are possibly referable to *S. flaccida* Eastwood,[a] but that species is known as yet only from the type specimen.

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[a] Bull. Torr. Club **29**: 80. 1902.

4. **Stachys ciliata** Dougl.; Benth. Lab. 539. 1832–36.

Stachys cooleyae Heller, Bull. Torr. Club **26**: 590. 1899.

Type locality: "Hab. in America boreali-occidentali: ad ripas fluminis Columbiae; *Douglas; Scouler.*"

Range: British Columbia to Oregon.

Specimens examined: Montesano, *Heller* 3960; Chehalis County, *Henderson* 2531; Clallam County, *Elmer* 2543; Olympic Mountains, *J. M. Grant* in 1889; Cascade Mountains, latitude 49°, *Lyall;* Seattle, *Piper* 178; Mount Adams, *Suksdorf* 667; Tacoma, *Flett* 121; Lake Quinault, *Lamb* 1285; Skokomish River, *Kincaid;* Nisqually Valley, *Allen* 131; Skamania County, *Suksdorf,* August 10, 1886; Goose Lake, *Flett* 1204; Peshastin, *Sandberg & Leiberg* 503; Fort Vancouver, *Tolmie;* Manor, *Piper,* July 14, 1899; Ellensburg, *Elmer* 498; *Whited* 399; Atanum Soda Springs, *Watt;* Union Gap, *Cotton* 490; Nason City, *Sandberg & Leiberg;* without locality, *Vasey* in 1889.

The leaves vary from nearly glabrous (typical) to soft-pilose but scarcely tomentose.

Zonal distribution: Transition.

5. **Stachys pubens** (A. Gray) Heller, Bull. Torr. Club **25**: 581. 1898.

Stachys ciliata pubens A. Gray, Syn. Fl. **2**[1]: 388. 1878.

Stachys emersoni Piper, Erythea **6**: 31. 1898.

Type locality: "Washington Terr. to Fraser River."

Range: Washington and British Columbia near the coast."

Specimens examined: Montesano, *Heller* 3902; Hoquiam, *Lamb* 1138; Ilwaco, *Savage* 9; Ocean Beach, *Henderson* in 1886; without locality, *Cooper* in 1854; Ilwaco, *Piper* 4990, 4919; Port Crescent, *Lawrence* 281a.

Zonal distribution: Humid Transition.

LYCOPUS.

Plants not stoloniferous; calyx teeth triangular-cuspidate longer than the nutlet .... 3. *L. americanus.*

Plants stoloniferous at base.

Calyx teeth subulate longer than the nutlet; leaves sharply serrate.. 1. *L. lucidus.*

Calyx teeth obtuse, shorter than the nutlet.......... 2. *L. uniflorus.*

1. **Lycopus lucidus** Turcz.; DC. Prod. **12**: 178. 1848.

Lycopus lucidus americanus A. Gray, Proc. Am. Acad. **8**: 286. 1870.

Type locality: "In montibus Ircutiae."

Range: Washington to California, Kansas, and Saskatchewan.

Specimens examined: Coulee City, *Lake & Hull* 600; Rock Lake, *Lake & Hull* 600; Spokane County, *Suksdorf* 601; Mabton, *Cotton* 749.

Zonal distribution: Upper Sonoran and Arid Transition.

2. **Lycopus uniflorus** Michx. Fl. **1**: 14. 1818.

Lycopus macrophyllus Benth. Lab. 185. 1833.

Lycopus communis Bicknell in Britton, Man. 803. 1901.

Type locality: "Hab. ad Lacus S- Joannis et Mistassins."

Range: British Columbia and Oregon to Labrador and Florida.

Specimens examined: Tacoma, *Flett* 15; Puyallup, *Piper,* September 2, 1899; Falcon Valley, *Suksdorf* 1439; Cascade Mountains, latitude 49°, *Lyall* in 1858–59; Copalis, *Conard* 405.

This species has heretofore been referred to *L. virginicus* L. and thus appears in Suksdorf's list.

Zonal distribution: Humid Transition.

3. **Lycopus americanus** Muhl.; Bart. Fl. Phila. Prod. 12. 1815.

Lycopus sinuatus Ell. Bot. S. C. & Ga. **1**: 26. 1816.

Type locality: Philadelphia, Pennsylvania.

RANGE: Temperate North America.

SPECIMENS EXAMINED: Lakeview, *Henderson*, July 25, 1892; Ellensburg, *Whited* 566, 1450; North Yakima, *Watt* August, 1895; *Henderson*, June 18, 1892; Alma, *Elmer* 543; Rock Lake, *Lake & Hull* 602; Spokane, *Piper*, October 1, 1900; Usk, *Kreager* 354; Seattle, *Piper*.

ZONAL DISTRIBUTION: Transition.

MENTHA. MINT.

Whorls of flowers all axillary.. 3. *M. canadensis*.
Whorls of flowers in terminal spikes, or some in the upper axils.
    Leaves lanceolate, sessile or nearly so; spikes slender.............. 1. *M. spicata*.
    Leaves ovate, petioled; spikes thick.............................. 2. *M. citrata*.

1. Mentha spicata L. Sp. Pl. **2**: 576. 1753. SPEARMINT.

TYPE LOCALITY: "Habitat in Dania, Germania, Anglia, Gallia."

SPECIMENS EXAMINED: North Yakima, *Watt* August, 1895; White Salmon, *Suksdorf*.

1a. Mentha spicata viridis L. Sp. Pl. **2**: 576. 1753.

TYPE LOCALITY: European.

SPECIMENS EXAMINED: Seattle, *Piper;* Vancouver, *Piper;* White Salmon, *Suksdorf*.

2. Mentha citrata Ehrh. Beitr. **7**: 150. 1792.

TYPE LOCALITY: "Europa."

SPECIMENS EXAMINED: Tacoma, *Flett* 155.

3. Mentha canadensis L. Sp. Pl. **2**: 577. 1753.

TYPE LOCALITY: "Habitat in Canada."

RANGE: British Columbia to New Brunswick, south to California and Virginia.

SPECIMENS EXAMINED: Clallam County, *Elmer* 2545; Seattle, *Piper* in 1885; Tacoma, *Flett* 874; Coulee City, *Lake & Hull*, August 6, 1892; *McKay* 16; North Yakima, *Watt* August, 1895; without locality, *Vasey* in 1889; Meyers Falls, *Kreager* 506; Spokane, *Dewart*, July 15, 1901; *Piper*, September 1, 1900; Prosser, *Cotton* 654; Clealum Lake, *Cotton* 842; Mabton, *Cotton* 748.

ZONAL DISTRIBUTION: Transition.

3a. Mentha canadensis borealis (Michx.).

Mentha borealis Michx. Fl. **2**: 2. 1803.

Mentha canadensis glabrata Benth. Lab. 181. 1833.

Mentha arvensis perardi Briq. Bull. Herb. Boiss **3**: 215. 1895.

TYPE LOCALITY: "Hab. juxta amnes ad sinum Hudsonis defluentes."

RANGE: British Columbia to Saskatchewan, south to Colorado and California.

SPECIMENS EXAMINED: Chehalis River, *Lamb* 1235; Silverton, *Bouck* 146a; Skamania County, *Suksdorf* 1000; Falcon Valley, *Suksdorf* 663, 664; Colville, *Lyall* in 1860; Lake Chelan, *Lake & Hull* 601; Pullman, *Lake & Hull* 601; without locality, *Vasey* in 1889; *Kreager* 481; 557, 446; Seattle, *Piper*, August, 1892.

ZONAL DISTRIBUTION: Transition.

3b. Mentha canadensis lanata (Piper).

Mentha arvensis lanata Piper, Bull. Torr. Club **29**: 223. 1902.

TYPE LOCALITY: Parrott, Lincoln County, Washington. Collected by Lake & Hull.

RANGE: Washington and Idaho to California.

SPECIMENS EXAMINED: Wilson Creek, *Lake & Hull*, August 5, 1892; Parrott, *Lake & Hull* 603; Rock Lake, *Lake & Hull* 601; Newport, *Kreager*, August 11, 1902; Mount Carlton, *Kreager* 295.

MICROMERIA.

1. **Micromeria chamissonis** (Benth.) Greene, Man. Bay Reg. 289. 1894.

YERBA BUENA.

Micromeria douglasii Benth. Lab. 372. 1834.

Thymus? douglasii Benth. Linnaea **6**: 80. 1831.

Thymus? chamissonis Benth. Linnaea **6**: 80. 1831.

TYPE LOCALITY: California.

RANGE: British Columbia and Idaho to California.

SPECIMENS EXAMINED: Cascade Mountains, latitude 49°, *Lyall* in 1859; upper Nisqually Valley, *Allen* 23; Orchard Point, *Piper*, July, 1895; Seattle, *Piper;* Woodlawn, *Henderson*, June 22, 1892; Fort Vancouver, *Tolmie;* Lake Kalispel, *Kreager* 349.

ZONAL DISTRIBUTION: Transition.

MADRONÈLLA.

Leaves narrowly oblong, green on both sides........................ 3. *M. odoratissima*

Leaves ovate-lanceolate.

  Paler beneath; nerves not prominent.......................... 1. *M. discolor.*

  Not paler beneath; nerves prominent.......................... 2. *M. nervosa.*

1. **Madronella discolor** Greene, Leaflets **1**: 169. 1906.

Monardella discolor Greene, Pittonia **2**: 24. 1889.

TYPE LOCALITY: "Near Clealum, Washington." Collected by Greene.

RANGE: Eastern Washington.

SPECIMENS EXAMINED: Clealum, *Greene*, August 14, 1889; Ellensburg, *Elmer* 373; *Whited* 547; without locality, *Vasey*, in 1889; Yakima, *Brandegee;* "coast prairies," *Cooper;* Mount Rainier, *Piper* 2078(?).

ZONAL DISTRIBUTION: Upper Sonoran.

2. **Madronella nervosa** Greene, Leaflets **1**: 169. 1906.

Monardella nervosa Greene, Pittonia **4**: 322. 1901.

TYPE LOCALITY: "The arid region of Eastern Washington." Collected by Sandberg & Leiberg.

RANGE: Eastern Washington.

SPECIMENS EXAMINED: Rock Island, *Sandberg & Leiberg*, in 1893; Okanogan County, *Whited* 195; White Bluff Ferry, *Lake & Hull* 705; Tampico, *Henderson* 2527; Cowiche Creek, *Cotton* 464; Alkali Lake, *Sandberg & Leiberg* 413; Yakima, *Howell;* Rattlesnake Mountains, *Cotton* 760.

ZONAL DISTRIBUTION: Upper Sonoran.

3. **Madronella odoratissima** Greene, Leaflets **1**: 168. 1906.

Monardella odoratissima Benth. Lab. 332. 1832–36.

TYPE LOCALITY: "In petrosis ad flumen Columbia et in rupibus alpestribus in montibus White Mountains." Collected by Douglas.

RANGE: Washington and Oregon.

SPECIMENS EXAMINED: Blue Mountains, *Piper* 2078; Meyers Falls, *Kreager* 499.

ZONAL DISTRIBUTION: Transition.

MELISSA.

1. **Melissa officinalis** L. Sp. Pl. **2**: 592. 1753. BALM.

TYPE LOCALITY: "Habitat in montibus Genevensibus, Allobrogicis, Italicis."

This plant is reported as escaped from gardens in Klickitat County, *Suksdorf.*

SCROPHULARIACEAE. Figwort Family.

Antheriferous stamens 5; leaves alternate........................ **Verbascum (p. 494.)**
Antheriferous stamens 2 or 4; leaves opposite or alternate.
  Fifth sterile stamen present.
    Corolla spurred at base.................................. **Linaria (p. 495).**
    Corolla not spurred.
      Sterile stamens represented by a gland or scale on the upper side of the corolla tube.
        Peduncles several-flowered.................... **Scrophularia (p. 495).**
        Peduncles 1-flowered.
          Corolla conspicuously bilabiate............ **Collinsia (p. 495).**
          Corolla nearly rotate..................... **Tonella (p. 496).**
      Sterile stamen elongated.
        Seeds wingless; anthers woolly or glabrous.... **Pentstemon (p. 497).**
        Seeds winged; anthers woolly................. **Chelone (p. 503).**
  Fifth sterile stamen wanting.
    Stamens 4, 2 antheriferous, 2 sterile.
      Sterile filaments 2-forked, exserted................ **Ilysanthes (p. 503).**
      Sterile filaments simple, included.................. **Gratiola (p. 503).**
    Stamens all antheriferous.
      Stamens 2.
        Calyx 5-parted............................... **Gratiola (p. 503).**
        Calyx 4-parted.
          Leaves alternate, mostly basal........... **Synthyris (p. 504).**
          Leaves opposite, at least the lower....... **Veronica (p. 505).**
      Stamens 4.
        Corolla nearly regular; leaves entire.......... **Limosella (p. 507).**
        Corolla 2-lipped.
          Stamens not inclosed in the upper lip.
            Leaves opposite; calyx prismatic.... **Mimulus (p. 507).**
            Leaves alternate; calyx campanulate. **Digitalis (p. 519).**
          Stamens included in the upper lip.
            Anther cells equal, parallel.
              Ovules 2 in each cell........... **Melampyrum (p. 511).**
              Ovules many.
                Calyx inflated in fruit; leaves opposite.................. **Rhinanthus (p. 511).**
                Calyx not inflated; leaves alternate or verticillate... **Pedicularis (p. 511).**
            Anther cells unequal.
              Lips of corolla unequal, the upper larger....................... **Castilleja (p. 513).**
              Lips of corolla subequal.
                Calyx lips cleft............. **Orthocarpus (p. 516).**
                Calyx lips entire............ **Adenostegia (p. 518).**

VERBASCUM.

Leaves large, densely woolly; flowers spicate............................ 1. *V. thapsus.*
Leaves glabrous, or nearly so; flowers racemose.......................... 2. *V. blattaria.*

1. Verbascum thapsus L. Sp. Pl. **1: 177. 1753.** **Mullein.**

Type locality: European.

Specimens examined: Whatcom County, *Gardner* 409; North Yakima, *Piper;* Puyallup, *Piper;* Pullman, *Piper.*

2. **Verbascum blattaria** L. Sp. Pl. **1**: 178. 1753. MOTH MULLEIN.

TYPE LOCALITY: European.

SPECIMENS EXAMINED: Manor, *Piper*, July 14, 1899; Conconully, *Whited* 1311; Waitsburg, *Horner*, July 25, 1896; Meyers Falls, *Kreager* 470.

LINARIA.

Flowers yellow, 25 to 30 mm. long.................................. 1. *L. linaria*.
Flowers blue, 6 to 8 mm. long.. 2. *L. canadensis*.

1. **Linaria linaria** (L.) Karst. Deutsch. Fl. 947. 1880–83. BUTTER-AND-EGGS.

Antirrhinum linaria L. Sp. Pl. **2**: 616. 1753.

Linaria vulgaris Mill. Gard. Dict. ed. 8. 1768.

TYPE LOCALITY: "Habitat in Europae ruderatis."

SPECIMENS EXAMINED: Woodlawn, *Henderson*, June 22, 1892; Waitsburg, *Horner* 383; Pullman, *Piper;* Meyers Falls, *Beattie & Chapman* 2235.

2. **Linaria canadensis** (L.) Dumort. Bot. Cult. **2**: 96. 1802.

Antirrhinum canadense L. Sp. Pl. **2**: 618. 1753.

TYPE LOCALITY: "Habitat in Virginia, Canada."

RANGE: British Columbia to California, east to Nova Scotia and Florida.

SPECIMENS EXAMINED: Alki Point, *Piper* in 1889; *Smith* in 1889; Woodlawn, *Henderson;* without locality, *Cooper;* La Camas, *Henderson.*

An infrequent plant in Washington, but according to Douglas "plentiful between Fort Vancouver and the Grand Rapids."

ZONAL DISTRIBUTION: Humid Transition.

SCROPHULARIA.

1. **Scrophularia californica** Cham. Linnaea **2**: 585. 1827. FIGWORT.

TYPE LOCALITY: San Francisco, California.

RANGE: British Columbia to Montana and California.

SPECIMENS EXAMINED: Montesano, *Heller* 4003; Hoquiam, *Lamb* 1224; Olympia, *Kincaid;* Goose Lake, *Flett* 1155; west Klickitat County, *Suksdorf*, June 4, 1886; Skamania County, *Suksdorf* 997; Ellensburg, *Whited* 688; Pullman, *Elmer* 879; *Piper*, July 21, 1894; Granville, *Conard* 339; Ilwaco *Piper.*

ZONAL DISTRIBUTION: Transition.

A variable species as here understood and possibly consisting of several. The specimens from near the seacoast are quite fleshy.

COLLINSIA.

Calyx lobes obtuse; inflorescence glandular.................... 4. *C. rattani*.
Calyx lobes acute; inflorescence not glandular.
  Filaments hairy at base; calyx lobes much longer than the tube and much exceeding the capsule; pedicels mostly solitary.. 1. *C. sparsiflora*.
  Filaments glabrous; calyx lobes scarcely longer than the tube and little exceeding the capsule; pedicels mostly in whorls.
    Tube of corolla longer than the limb; corolla 5 to 7 mm. long.................................... 2. *C. tenella*.
    Tube of corolla shorter than the limb; corolla 8 to 16 mm. long.
      Corolla 12 to 16 mm. long; pedicels deflexed in fruit.................................... 3. *C. grandiflora*.
      Corolla 8 to 10 mm. long; pedicels erect in fruit.. 3a. *C. grandiflora pusilla*.

1. **Collinsia sparsiflora** Fisch. & Mey. Ind. Sem. Hort. Petrop. **2**: 33. 1835.
TYPE LOCALITY: "Hab. circa coloniam ruthenorum Ross in Nova California."
RANGE: California to Klickitat County, Washington.
SPECIMENS EXAMINED: White Salmon, *Suksdorf* 298.

2. **Collinsonia tenella** (Pursh).
Antirrhinum tenellum Pursh, Fl. **1**: 421. 1814.
Collinsia parviflora Dougl.; Lindl. Bot. Reg. **13**: *pl. 1082*. 1827.
Collinsia pauciflora Lindl.; Hook. Fl. Bor. Am. **2**: 94. 1838.
TYPE LOCALITY: "On the banks of the Missouri", according to Pursh, but really from "Rockford Camp" [The Dalles of the Columbia]. Collected by Lewis.
RANGE: British Columbia to Lake Superior, Colorado, and California.
SPECIMENS EXAMINED: Admiralty Head, *Piper*, May, 1898; Puget Sound, *Cooper;* Olympia, *Henderson*, May 24, 1892; South Prairie, *Lizzie Hardy*, May 23, 1890; Falcon Valley, *Suksdorf;* Tampico, *Flett* 1183; Pasco, *Hindshaw* 28; Spokane Valley, *Lyall;* Nason Creek, *Sandberg & Lieberg* 621; Hangman Creek, *Sandberg & Leiberg* 31; Pullman, *Hull* 574; *Piper* 1656 and June 14, 1893; Rattlesnake Mountains, *Cotton* 327; Clallam County, *Elmer* 2586; Clarks Springs, *Kreager* 75.
ZONAL DISTRIBUTION: Transition and Upper Sonoran.

3. **Collinsia grandiflora** Dougl.; Lindl. Bot. Reg. **14**: *pl. 1107*. 1827.
TYPE LOCALITY: "Banks of the Columbia River at a distance of one hundred miles or more from the ocean." Collected by Douglas.
RANGE: British Columbia to California, and in north Idaho.
SPECIMENS EXAMINED: Orcas Island, *Lyall* in 1858; San Juan Island, *Lyall* in 1858; Steilacoom, *Cooper; Piper* in 1888; Olympia, *Henderson*, May 24, 1892; Falcon Valley, *Suksdorf;* mountains near Lower Cascades, *Suksdorf*, May 30, 1886; Fort Vancouver, *Garry*, April, 1826; Cape Horn, *Piper* 5004.
ZONAL DISTRIBUTION: Humid Transition.

3a. **Collinsia grandiflora pusilla** A. Gray, Syn. Fl. **2**^{1}: 256. 1878.
Collinsia pusilla Howell, Fl. N. W. Am. 506. 1901.
TYPE LOCALITY: Plumas County, California.
RANGE: British Columbia to California.
SPECIMENS EXAMINED: Whidby Island, *Gardner* 227; Tacoma, *Flett* 44; Olympia, *Kincaid*, July 4, 1896; Goat Mountains, *Allen* 240; Skokomish Valley, *Kincaid*, May 6, 1892.
ZONAL DISTRIBUTION: Humid Transition.

4. **Collinsia rattani** A. Gray, Syn. Fl. ed. 2. **2**^{1}: 439. 1886.
TYPE LOCALITY: Mendocino County, California.
RANGE: North California to Washington.
SPECIMENS EXAMINED: West Klickitat County, *Suksdorf*, April 24, 1886; White Salmon, *Suksdorf* 301; Simcoe Mountains, *Howell*, June, 1879.

COLLINSIA MINIMA Nutt. Journ. Acad. Phila. **7**: 47. 1834. Type locality, "Flat Head River." Collected by Wyeth. Range, Washington and Idaho. Specimens examined, Fort Colville, *Lyall*, March 30, 1861. This is perhaps not distinct from *C. tenella*, but the flowers are decidedly larger. More material is needed.

TONELLA.

Corolla 6 to 10 mm. broad .... 1. *T. floribunda.*
Corolla 2 to 3 mm. broad .... 2. *T. collinsioides.*

1. **Tonella floribunda** A. Gray, Proc. Am. Acad. **11**: 92. 1876.

TYPE LOCALITY: "Willow thickets of the valley of the Kooskooskee, in the western part of Idaho." Collected by Spalding and by Geyer.

RANGE: Western Idaho and adjacent Oregon and Washington.

SPECIMENS EXAMINED: Without locality, *Brandegee* 1003; Almota, *Piper* 1655; Wawawai, *Lake* 575; *Elmer* 103; Asotin Creek, *Hunter* 92.

ZONAL DISTRIBUTION: Upper Sonoran.

2. **Tonella collinsioides** Nutt.; A. Gray, Proc. Am. Acad. **7**: 378. 1868.

Collinsia tenella Benth.; DC. Prod. **10**: 593. 1846, not *C. tenella* (Pursh) Piper.

Tonella tenella Heller, Muhlenbergia **1**: 5. 1900.

TYPE LOCALITY: "In sylvis juxta flum. Oregon." Collected by Nuttall.

RANGE: California to Washington, in the coast region.

SPECIMENS EXAMINED: West Klickitat County, *Suksdorf*, April 27, 1881, May 12, 1895; Lyle, *Suksdorf*, April 14, 1890.

ZONAL DISTRIBUTION: Humid Transition.

PENTSTEMON. WILD FOXGLOVE.

- Anthers woolly.
  - Foliage glaucous.
    - Branches erect; leaves oblong to ovate, sessile, glabrous; corolla lilac-purple .... 1. *P. barrettae.*
    - Branches prostrate; leaves broadly ovate, petioled, puberulent; corolla rose-crimson .... 2. *P. rupicola.*
  - Foliage green, not glaucous.
    - Plants prostrate or decumbent; leaves small, oval to orbicular; flowering stems 5 to 20 cm. high.
      - Leaves serrate .... 3. *P. menziesii.*
      - Leaves entire .... 3a. *P. menziesii davidsonii.*
    - Plants usually erect, taller; leaves narrow.
      - Leaves lanceolate, attenuate-acuminate, not reduced on the flowering stems.............. 4. *P. lyallii.*
      - Leaves lanceolate, acute, entire or serrate, much reduced on the flowering stems.
        - Calyx lobes lanceolate, 0.5 to 1 cm. long... 5. *P. fruticosus.*
        - Calyx lobes subulate-lanceolate, 1 to 1.5 cm. long.............................. 6. *P. scouleri.*
- Anthers not woolly.
  - Cells of the anthers splitting their whole length or nearly the whole.
    - Plants glabrous, more or less glaucous.
      - Leaves coriaceous, the upper acuminate; corolla 1.5 to 2 cm. long .... 7. *P. acuminatus.*
      - Leaves not coriaceous, none acuminate; corolla 2.5 to 4 cm. long......................... 8. *P. glaber.*
    - Plants not glaucous, mostly more or less pubescent.
      - Margins of the leaves dentate.
        - Leaves narrow, oblong, lanceolate, or oblanceolate.
          - Corolla blue-purple, 1.5 to 2.5 cm. long. 9. *P. erianthera.*
          - Corolla white, 1 to 1.5 cm. long.
            - Leaves oblong to lanceolate, coarsely dentate; sterile filament beardless .... 10. *P. deustus.*

Leaves linear-lanceolate, denticulate; sterile filament bearded. . 11. *P. variabilis.*

Leaves broad, mostly ovate.

Herbage pruinose-puberulent throughout . . . . 12. *P. pruinosus.*

Herbage glabrous or nearly so.

Calyx lobes glandular. . . . . 13. *P. pinetorum.*

Calyx lobes not glandular . . . . 14. *P. ovatus.*

Margins of the leaves entire.

Herbage puberulent throughout.

Leaves oblong to ovate-lanceolate. . . . 15. *P. collinus.*

Leaves linear or linear-spatulate.

Corolla tubular-funnelform. . . . . . 19. *P. gairdneri.*

Corolla gaping. . . . . 19a. *P. gairdneri hians.*

Herbage glabrous.

Flowers 2 to 2.5 mm. long.

Corolla blue. 16. *P. procerus.*

Corolla pale yellow. . . . . 17. *P. confertus.*

Flowers 3 to 3.5 mm. long . . . . 18. *P. attenuatus.*

Cells of the anthers splitting only at apex, the bases sac-like.

Leaves glandular-pubescent. . . . . 20. *P. glandulosus.*

Leaves glabrous or nearly so.

Inflorescence glandular; corolla 3 cm. long. . . . . 21. *P. venustus.*

Inflorescence not glandular; corolla smaller.

Leaves linear or lanceolate, often in whorls of 3; corolla purple, 10 to 13 mm. long. . 24. *P. triphyllus.*

Leaves broader, oblong or ovate; corolla larger.

Corolla red, 20 to 25 mm. long; leaves coarsely dentate or lobed. . . . . 22. *P. richardsonii.*

Corolla blue, 15 to 20 mm. long; leaves finely serrate or dentate. . . . . 23. *P. diffusus.*

1. **Pentstemon barrettae** A. Gray, Syn. Fl. ed. 2. **2**^{1}: 440. 1886.

TYPE LOCALITY: "Mountains of Hood River, Oregon, near its confluence with the Columbia." Collected by Mrs. Barrett.

RANGE: Cascade Mountains of Washington and Oregon near the Columbia River.

SPECIMENS EXAMINED: Klickitat County, *Suksdorf* 395.

2. **Pentstemon rupicola** Howell, Fl. N. W. Am. 510. 1901.

Pentstemon newberryi rupicola Piper, Bull. Torr. Club **27**: 397. 1900.

TYPE LOCALITY: "Dry rocky cliffs, Mt. Rainier," Washington.

RANGE: Cascade Mountains of Washington.

SPECIMENS EXAMINED: Mount Rainier, *Piper* 2086; *Allen* 130; without locality, *Vasey*; Mount Adams, *Henderson*, August 9, 1892; *Suksdorf* 458; Klickitat River, *Flett* 1164; Nason Creek, *Sandberg & Leiberg* 667; Lake Chelan, *Gorman* 587; Cape Horn, *Piper* 4986.

ZONAL DISTRIBUTION: Hudsonian.

3. **Pentstemon menziesii** Hook. Fl. Bor. Am. **2**: 98. 1838.

TYPE LOCALITY: "Nutka." Collected by Menzies.

RANGE: British Columbia and Washington.

SPECIMENS EXAMINED: Olympic Mountains, *Piper* 2176; *Henderson*; Mount Rainier, *Piper* in 1888; Cascade Mountains, latitude 49°, *Lyall* in 1859; Mount Benson, *Macoun*

736; Baldy Peak, *Lamb* 1320; Silverton, *Bouck*, July, 1895 and 126; Yakima Pass, *Watson*, November 20, 1880; Clallam County, *Elmer* 2578.

ZONAL DISTRIBUTION: Arctic.

3a. Pentstemon menziesii davidsonii (Greene).

Pentstemon davidsonii Greene, Pittonia **2**: 241. 1892.

TYPE LOCALITY: "On Mt. Conness [California], at an altitude of 12,300 feet."

RANGE: Washington to California.

SPECIMENS EXAMINED: Olympic Mountains, *J. M. Grant;* Mount Rainier, *Allen* 279, 2087; Mount Adams, *Suksdorf; Henderson; Flett* 1166; Loomis, *Elmer* 584.

ZONAL DISTRIBUTION: Arctic.

4. Pentstemon lyallii A. Gray, Syn. Fl. **2**^{1}: 440. 1878.

Pentstemon menziesii lyallii, A. Gray, Proc. Am. Acad. **6**: 76. 1865.

TYPE LOCALITY: "Between Fort Colville and the Rocky Mountains." Collected by Lyall.

RANGE: Washington, Idaho, and British Columbia.

SPECIMENS EXAMINED: Stevens Pass, *Sandberg & Leiberg* 759, according to the label, but the specimen is almost certainly from Pend Oreille Lake, Idaho. The species will probably be found in Stevens county.

5. Pentstemon fruticosus (Pursh) Greene, Pittonia **2**: 239. 1892.

Gerardia fruticosa Pursh, Fl. **2**: 423. *pl. 18.* 1814.

Pentstemon crassifolius Lindl. Bot. Reg. **24** : *pl. 16.* 1838.

Pentstemon douglasii Hook. Fl. Bor. Am. **2**: 98. 1838.

Pentstemon lewisii Benth.; DC. Prod. **10**: 321. 1846.

Pentstemon adamsianus Howell, Fl. N. W. Am. 511. 1901.

TYPE LOCALITY: "In great abundance in the pine forests of the Rocky Mountains." Collected by Lewis, probably in Idaho.

RANGE: Cascade Mountains of British Columbia to Oregon, and eastward to west Montana.

SPECIMENS EXAMINED: Mountains north of Ellensburg, *Whited* 715, 1161; Mount Stuart, *Elmer* 1204; *Sandberg & Leiberg* 550; *Whited* 795; Mount Adams, *Suksdorf* 459 and July 12, 1886; Klickitat River, *Flett* 1152; Rock Island, *Sandberg & Leiberg* 459; Twisp River, *Whited*; Peshastin, *Sandberg & Leiberg*, July, 1893; Kittitas, *Lyall* in 1860; Naches Pass, *Watson*, November 25, 1880; Cascade Mountains to Fort Colville, *Lyall* in 1860, Clealum, *Henderson* in 1892; Nason City, *Sandberg & Leiberg;* Blue Mountains, *Lake & Hull* 686; *Piper* 2422, 2327.

ZONAL DISTRIBUTION: Canadian and Hudsonian.

Pentstemon crassifolius Lindl. is founded on a specimen with entire leaves, a valueless character, as both entire and serrate leaves may be found on the same plant and intergrades are very numerous; *P. douglasii* Hook. is a high altitude form with shorter and broader toothed leaves; *P adamsianus* Howell from Mount Adams and Mount St. Helens is a form with rather large, thinner leaves.

5a. Pentstemon fruticosus cardwellii (Howell).

Pentstemon cardwellii Howell, Fl. N. W. Am. 510. 1901.

TYPE LOCALITY : Base of Mount Hood, Oregon.

RANGE . Cascade mountains of Washington and Oregon.

SPECIMENS EXAMINED : Mount St. Helens, *Goodwin*, July 13, 1903.

This subspecies may be distinguished by its thickish serrulate mostly obtuse leaves.

6. Pentstemon scouleri Lindl. Bot. Reg. **15**: *pl. 1277.* 1829.

TYPE LOCALITY "Kettle Falls of the Columbia." Collected by Douglas.

RANGE: Apparently local in northeastern Washington

SPECIMENS EXAMINED. Near Spokane, *Miss Kate B. Reed,* Mount Carlton, *Kreager* 274.

7. **Pentstemon acuminatus** Dougl.; Lindl. Bot. Reg. **15:** *pl. 1285.* 1829.

Type locality: "Sandy plains of the Columbia." Collected by Douglas.

Range: Washington to Saskatchewan and Texas.

Specimens examined: Sunnyside, *Cotton* 381; Egbert Springs, *Sandberg & Leiberg*, July, 1893; Pasco, *Piper* 2985; *Hindshaw* 25; *Henderson* in 1892; Columbus, *Suksdorf*, June 10, 1886; Moses Lake, *Sandberg & Leiberg* 376; Horse Heaven, *Leckenby*, May, 1898; Eltopia, *Cotton* 1023; Wallula, *Cotton* 1039.

Zonal distribution: Upper Sonoran.

8. **Pentstemon glaber** Pursh, Fl. 738. 1814.

Pentstemon speciosus Dougl.; Lindl. Bot. Reg. **15** : *pl. 1270.* 1829.

Type locality: "Upper Louisiana." Collected by Bradbury.

Range: Washington to California, Arizona, and the Dakotas.

Specimens examined: Wenache, *Whited* 29, 1111; North Yakima, *Leckenby*, May, 1898; *Steinweg* in 1894; Ellensburg, *Piper* 2672; *Whited* 429; Simcoe Valley, *Lyall* in 1860; Naches Valley, *Lyall* in 1860; near Bickleton, *Suksdorf* 414; Wilson Creek, *Sandberg & Leiberg*, June, 1893; Ritzville, *Sandberg & Leiberg* 185; Fresh Lake, *McKay* 27; Blue Mountains, *Piper*, July 15, 1896; *Horner* 385.

Zonal distribution: Upper Sonoran.

9. **Pentstemon erianthera** Pursh, Fl. 737. 1814.

Pentstemon cristatus Nutt. Gen. **2:** 52. 1818.

Pentstemon whitedii Piper, Bot. Gaz. **22:** 490. 1901.

Type locality: "Upper Louisiana." Collected by Bradbury.

Range: Washington to Nevada and the Dakotas.

Specimens examined: Wenache, *Whited* 131, 1112, 1068, 1257, 1166; Spokane, *Leiberg* 28; *Dewart*, May 20, 1901.

Zonal distribution: Arid Transition.

10. **Pentstemon deustus** Dougl.; Lindl. Bot. Reg. **16:** *pl. 1318.* 1830.

Type locality: "Northwest America on scorched rocky plains in the interior." Collected by Douglas.

Range: British Columbia and Montana to eastern California.

Specimens examined: Wenache, *Whited* 95, 1083; Douglas County, *Spillman*, May 27, 1896; Sprague, *Sandberg & Leiberg* 170; Blue Mountains, *Piper* in 1896; along Tukanon River, *Lake & Hull*, July 1, 1892; Wawawai, *Lake & Hull* 711; *Piper* 1891; *Elmer* 751.

Zonal distribution: Arid Transition and Upper Sonoran.

11. **Pentstemon variabilis** Suksdorf, Deutsch. Bot. Monatss. **18:** 153. 1900.

Pentstemon paniculatus Howell, Fl. N. W. Am. 513. 1901.

Type locality: "In Schluchten ostlich vom Klickitat-flusse," Klickitat County, Washington.

Range: Klickitat County, Washington.

Specimens examined: Klickitat County, *Suksdorf* 417, 999; *Howell* in 1879; opposite The Dalles, *Howell* 162.

12. **Pentstemon pruinosus** Dougl.; Lindl. Bot. Reg. **15:** *pl. 1280.* 1829.

Type locality: "Near Priests Rapids of the Columbia," Collected by Douglas.

Range: Central Washington.

Specimens examined: Near Wenache, *Whited* 1; Wenache region, *Brandegee* 1005; Wenache Mountains, *Whited* 1256, 1255; Ellensburg, *Piper* 2670; Douglas County, *Spillman*, May 27, 1896; Coulee City, *Piper* 3859; Lakeside, *Griffiths & Cotton*, June 17, 1902.

Zonal distribution: Arid Transition.

13. **Pentstemon pinetorum** Piper.

Pentstemon ovatus pinetorum Piper, Fl. Palouse Reg. 158. 1901.

Pentstemon veronicaefolius Greene, Leaflets 1: 167, 1906.

TYPE LOCALITY: Cedar Mountains, Latah County, Idaho.

RANGE: Washington and Idaho.

SPECIMENS EXAMINED: Simcoe Hills, *Howell* 345; west Klickitat County, *Suksdorf* 32; Atanum River, *Lyall* in 1860; Falcon Valley, *Suksdorf* 460; Cascade Mountains, latitude 49°, *Lyall* in 1860; *Kellogg & Harford* 669; Leavenworth, *Savage* 48; mountains near Yakima, *Henderson;* mountains near Lower Cascades, *Suksdorf,* May 30, 1886; Kamiak Butte, *Elmer* in 1897; Goose Lake, *Flett* 1157; without locality, *Vasey* in 1889; Chelan Butte, *Griffiths & Cotton* 166.

ZONAL DISTRIBUTION: Arid Transition.

14. **Pentstemon ovatus** Dougl.; Hook. Bot. Mag. **56**: *pl. 2903.* 1829.

TYPE LOCALITY: "High mountains about the Grand Rapids of the Columbia." Collected by Douglas.

RANGE: Cascade Mountains of Washington and Oregon, and westward.

SPECIMENS EXAMINED: Upper Nisqually Valley, *Allen* 16; Mount Rainier, *Piper* 2068; Clallam County, *Elmer* 2576; Cape Horn, *Piper* 5033.

ZONAL DISTRIBUTION: Canadian.

15. **Pentstemon collinus** A. Nelson, Bull. Torr. Club **25**: 279. 1898.

TYPE LOCALITY: Evanston, Wyoming.

RANGE: Washington, Oregon, and Wyoming.

SPECIMENS EXAMINED: Ellensburg, *Whited* 430; *Piper,* May 20, 1897; Tampico, *Flett* 1181; Falcon Valley, *Suksdorf,* June 26, 1886; Ritzville, *Sandberg & Leiberg* 187.

ZONAL DISTRIBUTION: Upper Sonoran.

16. **Pentstemon procerus** Dougl.; Graham, Edinb. New Phil. Journ. 348. 1829, also Hook. Bot. Mag. *pl. 2954.* 1829.

Pentstemon confertus coeruleo-purpureus A. Gray, Proc. Am. Acad. **6**: 72. 1866.

Pentstemon tolmiei Hook. Fl. Bor. Am. **2**: 98. 1838.

Pentstemon pulchellus Greene, Pittonia **3**: 310. 1898.

TYPE LOCALITY: "In swampy and overflowed lands between Fort Vancouver and the Grand Rapids of the Columbia on the north side."

RANGE: Alaska to California and Colorado.

SPECIMENS EXAMINED: Olympic Mountains, *J. M. Grant;* Mount Rainier, *Piper* 2088; *Smith* 751; *Allen* 298; Mount Adams, *Henderson* in 1892; *Suksdorf* in 1886; *Flett* 1165; Mount Stuart, *Elmer* 1170; *Sandberg & Leiberg* 549; Cascade Mountains, latitude 49°, *Lyall;* Ellensburg, *Whited* 436; Yakima, *Leckenby,* May 10, 1898; Thorp, *Whited* 401; Klickitat River, *Flett* 1178; Falcon Valley, *Suksdorf,* July 17, 1886; Spokane, *Piper* 2636; Palouse, *Cloud* in 1894; without locality, *Tolmie.*

ZONAL DISTRIBUTION. Transition to Arctic.

17. **Pentstemon confertus** Dougl.; Lindl. Bot. Reg. **15**: *pl. 1260.* 1829.

TYPE LOCALITY: "In mountainous pine woods in dry sandy soils between Salmon River and the Kettle Falls of the Columbia, in 48° N. latitude." Collected by Douglas.

RANGE: British Columbia to Oregon and Idaho.

SPECIMENS EXAMINED: Mount Rainier, *Allen* 39; *Piper* 2079; Goat Mountains, *Allen* 244; Wenache Mountains, *Whited* 716; Peshastin, *Sandberg & Leiberg,* July, 1893; Ritzville, *Sandberg & Leiberg* 189; Leavenworth, *Whited* 249; Spokane, *C. A. Ramm;* Pullman, *Piper; Hull; Elmer;* Mount Carlton, *Kreager* 234; Clarks Springs, *Kreager* 67, 29.

ZONAL DISTRIBUTION: Transition to Arctic.

18. **Pentstemon attenuatus** Dougl.; Lindl. Bot. Reg. **15**: *pl. 1295.* 1829.

Pentstemon ellipticus Greene, Leaflets **1**: 167. 1906, not Coult. & Fisher, 1893.

Pentstemon confertus globosus Piper, Bull. Torr. Club **27**: 397, 1900.

TYPE LOCALITY: "Mountains of Lewis and Clark's River," that is, Craig Mountains, Idaho. Collected by Douglas.

RANGE: Blue Mountains of Washington and Oregon, and adjacent Idaho.

SPECIMENS EXAMINED: Wenache Mountains, *Whited* 1162, 1254; Mount Stuart, *Sandberg & Leiberg* 549; Kamiak Butte, *Piper* 3093; *Elmer* 807; Blue Mountains, *Horner* 384; *Piper* in 1896; *Douglas;* Yakima County, *Henderson,* May 29, 1892; Mount Adams, *Henderson* August 9, 1892; Wenache Mountains, *Cotton* 1295.

ZONAL DISTRIBUTION: Arid Transition.

This species is exceedingly variable as to color of the flower. While pale yellow is perhaps the commonest tint, it varies from pink to dull red, lavender to violet, pale blue to dark blue and to white. Occasionally all these color forms occur in close proximity.

19. Pentstemon gairdneri Hook. Fl. Bor. Am. **2**: 99. 1838.

TYPE LOCALITY: "Blue Mountains of N. W. America." Collected by Douglas.

RANGE: Eastern Washington and eastern Oregon and Nevada.

SPECIMENS EXAMINED: Wenache Region, *Brandegee* 1007; Wenache, *Whited* 1084; Egbert Springs, *Sandberg & Leiberg* 355; Columbia River, latitude 46° to 49°, *Lyall;* Simcoe Mountains, *Howell* 344 and July, 1880; Cleveland, *Suksdorf* 413; upper Naches River, *Henderson,* June 15, 1892; Cascade Mountains, *Mrs. Steinweg* in 1894; without locality, *Howell* May, 1891.

ZONAL DISTRIBUTION: Upper Sonoran.

19a. Pentstemon gairdneri hians Piper, Bull. Torr. Club **27**: 396. 1900.

TYPE LOCALITY: Eastern Washington. Collected by G. R. Vasey.

RANGE: Eastern Washington and eastern Oregon.

SPECIMENS EXAMINED: Wenache, *Whited* 36; Ellensburg, *Piper* 2702; without locality, *Vasey* in 1889; Wenache Mountains, *Cotton* 1294.

ZONAL DISTRIBUTION: Upper Sonoran.

20. Pentstemon glandulosus Dougl.; Lindl. Bot. Reg. **15**: *pl. 1262.* 1829.

TYPE LOCALITY: "In the Rocky Mts., Lat. 47° N. and at the base of the Blue Mts., on the banks of the Kooskooskee River." Collected by Douglas.

RANGE: Interior of Washington and Oregon and adjacent Idaho.

SPECIMENS EXAMINED: Near Wenache, *Whited* 30, 1082; Klickitat County, *Howell,* June, 1879; Yakima Valley, *Brandegee* 1008; Whitman County opposite Clarkston, *Hunter;* without locality, *Vasey* in 1889; Simcoe Mountains, *Howell,* July, 1881.

ZONAL DISTRIBUTION: Upper Sonoran and Arid Transition.

21. Pentstemon venustus Dougl.; Lindl. Bot. Reg. **16**: *pl. 1309.* 1830.

TYPE LOCALITY: "Gravelly channels of rivulets of the Blue Mountains and near the source of the Walla Walla River." Collected by Douglas.

RANGE: Blue Mountains and adjacent Idaho.

SPECIMENS EXAMINED: Blue Mountains, *Lake & Hull* 712; *Piper,* July, 1896; Asotin Creek, *Hunter* 97; Waitsburg, *Horner.*

ZONAL DISTRIBUTION: Arid Transition.

22. Pentstemon richardsonii Dougl.; Lindl. Bot. Reg. **13**: *pl. 1121.* 1827.

TYPE LOCALITY: "On bare dry rocks in the vicinity of the Columbia and its branches." Collected by Lewis.

RANGE: Oregon and Washington.

SPECIMENS EXAMINED: Ellensburg, *Elmer* 405; *Whited* 572; Wenache, *Whited* in 1896, 1306; North Yakima, *Piper,* July 9, 1897; Egbert Springs, *Sandberg & Leiberg* 345; Atanum Springs, *Watt,* August, 1895; Rock Island, *Sandberg & Leiberg,* July, 1893; Cape Horn, *Suksdorf* 2319; Parker, *Dunn,* August 10, 1901; Kettle Falls, *Watson* 300; Columbia River above the Chelan River, *Watson;* Fresh Lake, *McKay* 12; Spokane County, *Mrs. Tucker;* Spokane, *Piper,* July 26, 1896; Cascade Mountains, *Mrs. Steinweg* in 1894; withwithout locality, *Cooper;* Marcus, *Kreager* 464.

ZONAL DISTRIBUTION: Arid Transition and Upper Sonoran.

23. **Pentstemon diffusus** Dougl.; Lindl. Bot. Reg. **14:** *pl. 1132.* 1828.

TYPE LOCALITY: "In the districts around the mouth of the Columbia River." Collected by Douglas.

RANGE: British Columbia to Oregon in the coast region.

SPECIMENS EXAMINED: Olympic Mountains, *Piper* 2178; Mount Elinor, *Jennie V. Getty*, August, 1902; Mount Rainier, *Piper* 2068; Goat Mountains, Allen 129; Mount Adams, *Suksdorf* 48; Cascade Mountains, latitude 49°, *Lyall;* Goose Lake, *Flett* 1157; Baldy Peak, *Lamb* 1369; Silverton, *Bouck* 143; Skokomish River, *Kincaid*, June 17, 1892; Skagit Pass, *Lake & Hull*, August, 1892; Stevens Pass, *Sandberg & Leiberg* 787; Stehekin, *Whited* 1386; Stampede Pass, *Henderson*, July 12, 1892; along Twisp River, *Whited* 218; Bridge Creek, *Elmer* 638; Clallam County, *Elmer* 2585; Stehekin, *Griffiths & Cotton* 609, 610; Cape Horn, *Piper* 5032.

ZONAL DISTRIBUTION: Canadian.

24. **Pentstemon triphyllus** Dougl.; Lindl. Bot. Reg. **15:** *pl 1245.* 1829.

TYPE LOCALITY: "On decomposed dry granite, or schist rocks, on the Blue Mountains of North-west America."

RANGE: British Columbia to Oregon and Idaho.

SPECIMENS EXAMINED: "Boundary N. W. Coast," *Cooper;* Columbia Valley, *Lyall* in 1860; Rockland, *Suksdorf* 998; Palouse River, *Lyall*, July, 1860; Snake River, *Brandegee* 1010; Almota, *Piper* 1865; Wawawai, *Lake & Hull* 710.

ZONAL DISTRIBUTION: Upper Sonoran and Arid Transition.

CHELONE.

1. **Chelone nemorosa** Dougl.; Lindl. Bot. Reg. **14:** *pl. 1211.* 1829. TURTLEHEAD.

Chelone ramosa Dougl.; Hook. Fl. Bor. Am. **2:** 95. 1838.

Pentstemon nemorosus Trautv. Bull. Acad. St. Petersb. **5:** 345. 1839.

TYPE LOCALITY: "A native of mountain woods, near springs and rivulets, in the northwest of North America." Collected by Douglas.

RANGE: British Columbia to north California.

SPECIMENS EXAMINED: Olympic Mountains, *Piper* in 1890; Snoqualmie, *Parker;* Mount Rainier, *Piper* 2080; *Allen* 275; Mount Adams, *Suksdorf;* Klickitat River, *Flett* 1153; Green River Hot Springs, *Piper* in 1887; without locality, *Vasey* in 1889; Clallam County, *Elmer* 2575; Skokomish River, *Kincaid*, June, 1892; Stampede Tunnel, *Henderson*, July, 1892.

ZONAL DISTRIBUTION: Canadian and Hudsonian.

ILYSANTHES.

1. **Ilysanthes dubia** (L.) Barnhart, Bull. Torr. Club. **26:** 376. 1899.

Gratiola dubia L. Sp. Pl. 17. 1753.

Ilysanthes gratioloides Benth. in DC. Prod. **10:** 419. 1846.

Capraria gratioloides L. Sp. Pl. ed. 2. **2:** 876. 1763.

TYPE LOCALITY: Virginia.

RANGE: Washington to California and Canada to Texas and Florida.

SPECIMENS EXAMINED: Green Lake, *Piper* 2864; west Klickitat County, *Suksdorf* 2192, 1473; Parker, *Dunn*, August 8, 1901; Lake Chelan, *Lake & Hull*, August 12, 1892, Waitsburg, *Horner* 593; Almota, *Piper* 2658; Toppenish, *Griffiths & Cotton* 797.

ZONAL DISTRIBUTION: Upper Sonoran and Transition.

GRATIOLA.

Calyx with a pair of bracts equaling the calyx lobes	1. *G. virginiana.*
Calyx bractless	2. *G. ebracteata.*

1. **Gratiola virginiana** L. Sp. Pl. **1:** 17. 1753.

TYPE LOCALITY: "Habitat in Virginia."

RANGE: British Columbia to Canada, south to California, Texas, and Florida.

SPECIMENS EXAMINED: Ellensburg, *Whited* 691; Toppenish, *Henderson*, May 28, 1892; Lindleys, *Henderson*, June 9, 1892; Kalama, *Piper*, October 31, 1901; Sumas, *Lyall* in 1858–59; Colville, *Lyall* in 1860; Lake Chelan, *Lake & Hull*, August 12, 1892; Manor, *Piper*, July 14, 1899; Spokane, *Piper* 2641; Pullman, *Piper* 1664; *Hull* 708; without locality, *Vasey* in 1889; Lake Kalispel, *Kreager* 318; Vancouver, *Piper* 5025.

ZONAL DISTRIBUTION: Transition.

2. **Gratiola ebracteata** Benth.; A. DC. Prod. **10**: 595. 1846.

TYPE LOCALITY: "In planitiebus terrae Oregon." Collected by Nuttall.

RANGE: Washington to California in the coast region.

SPECIMENS EXAMINED: Tacoma, *Flett* 472; Roslyn, *Whited* 472.

ZONAL DISTRIBUTION: Transition.

SYNTHYRIS.

Flowers in spikes; leaves not reniform-orbicular.
  Petals wanting; leaves ovate, crenate .... 1. *S. rubra.*
  Petals present; leaves cleft into narrow segments .... 2. *S. pinnatifida.*
Flowers in racemes; leaves reniform-orbicular.
  Petals laciniately incised .... 3. *S. schizantha.*
  Petals entire.
    Scapes weak, usually shorter than the thin leaves .... 4. *S. rotundifolia.*
    Scapes stout, exceeding the thick leaves .... 5. *S. reniformis.*

1. **Synthyris rubra** (Dougl.) Benth. in DC. Prod. **10**: 454. 1846.

Gymnandra rubra Dougl.; Hook. Fl. Bor. Am. **2**: 103. 1838.

Besseya rubra Rydberg, Bull. Torr. Club **30**: 280. 1903.

TYPE LOCALITY: "Banks of M'Gillivray's and Flathead Rivers, near the Kettle Falls of the Columbia, and in the valleys of the Rocky Mountains." Collected by Douglas.

RANGE: British Columbia to Oregon and Idaho.

SPECIMENS EXAMINED: Fort Colville, *Lyall* in 1861; near Rockford, *Watson*; Rock Lake, *Sandberg & Leiberg*, May, 1893; Waterville, *Whited* 1221; Spokane County, *Suksdorf* 422; Hangman Creek, *Sandberg & Leiberg* 58; Pullman, *Piper* 1658; *Elmer* 166; Clarks Springs, *Kreager* 24.

ZONAL DISTRIBUTION: Arid Transition.

2. **Synthyris pinnatifida lanuginosa** subsp. nov.

Densely appressed white-woolly. Otherwise as in the species.

Collected in gravelly soil in the Olympic Mountains at 1,650 meters altitude, August 30, 1898, by J. B. Flett (no. 815). The occurence of the subspecies so far detached from its related species of the Rocky Mountains seems remarkable. It may be expected to turn up in the Cascade Mountains, possibly with intermediate character of pubescence. The type is deposited in the National Herbarium.

3. **Synthyris schizantha** Piper, Bull. Torr. Club **29**: 223. 1902.

TYPE LOCALITY: Baldy Peak, Olympic Mountains, Washington.

RANGE. Washington.

SPECIMENS EXAMINED: Baldy Peak, *Lamb* 1343; *Conard* 301, mountains of Lewis County near Elbe, *Flett* 2711.

4. **Synthyris rotundifolia** A. Gray, Syn. Fl. $\mathbf{2^1}$: 285. 1878.

TYPE LOCALITY. "Oregon, in shady woods of the Columbia and Willamette."

RANGE. Washington and Oregon in the coast region.

SPECIMENS EXAMINED. Chehalis, *Gardner* 240. Skamania County, *Suksdorf* 1474; west Klickitat County, *Suksdorf*. Fort Vancouver, *Wilcox; Piper* 4922.

ZONAL DISTRIBUTION. Humid Transition.

5. Synthyris reniformis (Dougl.) Benth. in DC. Prod. **10**: 454. 1846.

Wulfenia reniformis Dougl.; Hook. Fl. Bor. Am. **2**: 102. *pl. 71.* 1838.

Type locality: "Common about the Grand Rapids of the Columbia and in the vallies of the Blue Mountains."

Range: Washington, Oregon, and Idaho.

Specimens examined: Kamiak Butte, *Elmer* 320.

Zonal distribution: Canadian and Hudsonian.

VERONICA. Speedwell.

- Annuals; flowers solitary in the axils.
  - Pubescent; petals blue; leaves crenate.
    - Pedicels short; upper leaves reduced .... 1. *V. arvensis.*
    - Pedicels long; upper leaves not reduced .... 10. *V. tournefortii.*
  - Glabrous or nearly so; petals white; leaves mostly entire .... 2. *V. peregrina.*
- Perennials; flowers in racemes.
  - Peduncles terminal.
    - Capsules elliptic, emarginate; leaves all sessile.
      - Leaves shorter than the internodes; corolla 5 to 6 mm. broad .... 3. *V. alpina.*
      - Leaves longer than the internodes; corolla 6 to 10 mm. broad.
        - Corolla 8 to 10 mm. broad, blue .... 4. *V. cusickii.*
        - Corolla 6 to 7 mm. broad, white .... 5. *V. allenii.*
    - Capsules orbicular, obcordate; lower leaves petioled .... 6. *V. serpyllifolia.*
  - Peduncles axillary.
    - Leaves linear or linear-lanceolate; capsule deeply notched ... 9. *V. scutellata.*
    - Leaves oblong-lanceolate to ovate; capsule with a shallow notch.
      - Cauline leaves sessile or somewhat clasping .... 7. *V. anagallis-aquatica.*
      - Cauline leaves short-petioled .... 8. *V. americana.*

1. Veronica arvensis L. Sp. Pl. **1**: 13. 1753.

Type locality: European.

Specimens examined: Seattle, *Piper,* July 10, 1895; Lower Cascades, *Suksdorf;* Waitsburg, *Horner* 601; Wawawai, *Piper* 3825.

2. Veronica peregrina L. Sp. Pl. **1**: 14. 1753.

Type locality: European.

Range: British Columbia to Nova Scotia, south to California and Florida.

Specimens examined: Clallam County, *Elmer* 2591; west Klickitat County, *Suksdorf* 1478; Ellensburg, *Whited* 653; Tampico, *Flett* 1185; Columbia River, *Lyall;* Hangman Creek, *Sandberg & Leiberg* 67; Pullman, *Piper,* July, 1893; *Hull* 578; without locality *Vasey* in 1889; Mount Carlton, *Kreager* 154; Lake Kalispel, *Kreager* 334.

Zonal distribution: Upper Sonoran and Transition.

3. Veronica alpina L. Sp. Pl. **1**: 11. 1753.

Veronica wormskioldii Roem. & Schult. Syst. **1**: 101. 1817.

Type locality: "Habitat in Alpibus Europae."

Range: Alaska to Labrador, south to California and New England.

Specimens examined: Olympic Mountains, *Piper,* August, 1895; Cascade Mountains, latitude 49°, *Lyall* in 1859; Silverton, *Bouck* 143a; Mount Rainier, *Flett* 243; *Piper* 2083; *Allen* 277; Mount Stuart, *Elmer* 1121; Little Klickitat River, *Henderson,* August 4, 1892; Klickitat River, *Flett* 1154; Stevens Pass, *Sandberg & Leiberg* 710.

Zonal distribution: Arctic.

4. Veronica cusickii A. Gray, Syn. Fl. **2**^{1}: 288. 1878.

TYPE LOCALITY: "Alpine region of the Blue Mountains," Oregon. Collected by Cusick.

RANGE: Washington to California.

SPECIMENS EXAMINED: Clallam County, *Elmer* 2587; Mount Rainier, *Allen* 95; *Piper* 2084; Paradise Valley, *Flett* 269; Mount Adams, *Henderson*, August 3, 1892; Mount Stuart, *Brandegee* 1019; Horseshoe Basin, *Lake & Hull* 580; Bridge Creek, *Elmer* 661.

ZONAL DISTRIBUTION: Arctic.

5. Veronica allenii Greenman, Bot. Gaz. **25**: 263. 1898.

TYPE LOCALITY: "Along Paradise River on Mt. Rainier, altitude 1,700 m." Collected by O. D. Allen.

RANGE: Known only from the type locality.

SPECIMENS EXAMINED: Mount Rainier, *Allen* 95a.

6. Veronica serpyllifolia humifusa (Dickson) Hook. Fl. Bor. Am. **2**: 101. 1838.

Veronica humifusa Dickson, Trans. Linn. Soc. **2**: 288. 1794.

TYPE LOCALITY: Scotland.

RANGE: Alaska to California, Colorado, and New England.

SPECIMENS EXAMINED: San Juan Island, *Lyall* 1858; Admiralty Head, *Piper*, May, 1898; Silverton, *Bouck* 138; Mount Adams, *Suksdorf* 598; Skamania County, *Suksdorf* 1477; mountains south of Ellensburg, *Whited* 729; without locality, *Henderson*, May 24, 1892; Spokane Valley, *Lyall;* without locality, *Vasey* in 1889; Mount Carlton, *Kreager* 249.

ZONAL DISTRIBUTION: Transition.

7. Veronica anagallis-aquatica L. Sp. Pl. **1**: 12. 1753.

TYPE LOCALITY: European.

RANGE: British Columbia to Nova Scotia and New Mexico.

SPECIMENS EXAMINED: Fort Colville, *Lyall* in 1860.

8. Veronica americana Schwein.; DC. Prod. **10**: 468. 1846.

TYPE LOCALITY: "In America boreali a Canada et Carolina usque ad flum. Oregon et in ins. Sitcha."

RANGE: Alaska to California and the Atlantic States.

SPECIMENS EXAMINED: Cascade Mountains, latitude 49°, *Lyall* in 1859; Silverton, *Bouck* 138a, 138b; Tacoma, *Flett* 163; Skamania County, *Suksdorf* 1460; Columbus, *Suksdorf;* Klickitat River, *Flett* 1160; Egbert Springs, *Sandberg & Leiberg* 368; Wenache, *Whited;* Ellensburg, *Whited* 492; Toppenish, *Henderson*, May, 1892; Cold Creek, *Cotton* 376; Tieton River, *Cotton* 446; Grand Coulee, *McKay* 15; Coulee City, *Lake & Hull* 581; Tukanon River, *Lake & Hull*, July 1, 1892; Wawawai, *Lake & Hull*, June 4, 1892; Pullman, *Piper*, July, 1901; without locality, *Vasey* in 1889; Clarks Springs, *Kreager* 53.

ZONAL DISTRIBUTION: Upper Sonoran and Transition.

9. Veronica scutellata L. Sp. Pl. **1**: 12. 1753.

TYPE LOCALITY: European.

RANGE: British Columbia to Quebec, south to California, Minnesota, and New York. Europe. Asia.

SPECIMENS EXAMINED: Muckleshoot Prairie, *Dr. Ruhn;* Nisqually Valley, *Allen* 228; west Klickitat County, *Suksdorf* 1476; Ellensburg, *Whited* 562, 849; Toppenish, *Henderson*, May 28, 1892; Pullman, *Piper*, July 3, 1894; without locality, *Vasey* in 1889; Usk, *Kreager* 357; Satus, *Cotton* 1135.

ZONAL DISTRIBUTION: Upper Sonoran and Transition.

10. Veronica tournefortii Gmel. Fl. Bad. **1**: 39. 1805.

Veronica buxbaumii Tenore, Fl. Nap. **1**: 7. *pl. 1*. 1811.

TYPE LOCALITY: "Prope Carlsruhe," Germany.

SPECIMENS EXAMINED: Pullman, *Piper*, July, 1894.

LIMOSELLA.

- Leaves filiform-linear.. 1. *L. tenuifolia.*
- Leaves spatulate or oblong.. 2. *L. aquatica.*

1. **Limosella tenuifolia** Hoffm. Deutsch. Fl. 1²: 29. 1804.
TYPE LOCALITY: Germany.
RANGE: Washington; Labrador to New Jersey. Europe.
SPECIMENS EXAMINED: Kalama, *Piper*, October 31, 1901; Lake Chelan, *Elmer* 491.
Perhaps only a subspecies of *L. aquatica.*

2. **Limosella aquatica** L. Sp. Pl. **2**: 631. 1753.
TYPE LOCALITY: "Habitat in Europae septentrionalis inundatis"
RANGE: Alaska to Labrador, south to California and Colorado. Europe. Asia. South America.
SPECIMENS EXAMINED: White Salmon, *Suksdorf;* Ritzville, *Sandberg & Leiberg* 193.

MIMULUS.

- Flowers reddish or purple.
  - Corolla with a very long slender tube.............................. 1. *M. subuniflorus.*
  - Corolla with a moderate tube.
    - Stigmas funnelform.
      - Leaves elliptic, acute; corolla 1.5 to 2 cm. long....... 2. *M. nanus.*
      - Leaves ovate, acuminate; corolla 2 to 2.5 cm. long.... 3. *M. cusickii.*
    - Stigmas 2-lipped.
      - Flowers very small, about .5 mm. long, pale purple.... 4. *M. breweri.*
      - Flowers large, over 2 cm. long.
        - Corolla scarlet; stamens exserted................ 5. *M. cardinalis.*
        - Corolla rose-purple; stamens included........... 6. *M. lewisii.*
- Flowers yellow; stigmas 2-lipped.
  - Calyx not angled, deeply 5-cleft.............................. 7. *M. pilosus.*
  - Calyx 5-angled, 5 toothed.
    - Perennials.
      - Flowers solitary on scapes.......................... 8. *M. primuloides.*
      - Flowering stems leafy.
        - Leaves pinnately veined.
          - Herbage glabrous.......................... 9. *M. dentatus.*
          - Herbage slimy-viscid, musk-scented......... 10. *M. moschatus.*
        - Leaves palmately veined.
          - Rootstocks wanting.
            - Stems stout or stoutish, 10 to 60 cm. high; leaves not viscid; corolla 2 to 5 cm. long.............................. 11. *M. langsdorfii.*
            - Stems very slender 5 to 20 cm. high, few-flowered; corolla 12 to 15 mm. long; leaves small......................... 13. *M. microphyllus.*
          - Rootstocks present.
            - Stems 2 to 4 cm. high, mostly 1-flowered; plants stoloniferous, densely matted, alpine.............................. 12. *M. alpinus.*
            - Stems 10 to 20 cm. high, mostly several-flowered, arising from slender matted rootstocks; herbage slimy-viscid...... 14. *M. implexus.*
    - Annuals.
      - Corolla rather large; leaves palmately veined......... 15. *M. nasutus.*

Corolla small; leaves pinnately veined.
  Calyx teeth unequal, the lower two larger........ 16. ***M. alsinoides.***
  Calyx teeth subequal.
    Fruiting calyx distended.
      Corolla 10 to 12 mm. long.............. 17. ***M. pulsiferae.***
      Corolla 4 to 5 mm. long................ 18. ***M. breviflorus.***
    Fruiting calyx cylindrical.
      Leaves sessile; corolla scarcely exceeding calyx.......................... 19. ***M. suksdorfii.***
      Leaves petioled; corolla larger.
        Plant erect, not villous............ 20. ***M. peduncularis.***
        Plant spreading or prostrate, villous and slimy-viscid................ 21. ***M. floribundus.***

1. **Mimulus subuniflorus** (Hook. & Arn.)
Mimulus douglasii A. Gray, Bot. Cal. **1**: 563. 1876.
Mimulus nanus subuniflorus Hook. & Arn. Bot. Beech. Voy. 378. 1840
Eunanus douglasii Benth. in DC. Prodr. **10**: 374. 1846.
TYPE LOCALITY: California.
RANGE: Klickitat County, Washington, to California.
SPECIMENS EXAMINED: Klickitat Hills, *Gorman*, May 16, 1901.

2. **Mimulus nanus** Hook. & Arn. Bot. Beech. Voy. 378. 1840.
Eunanus tolmiei Benth. in DC. Prod. **10**: 374. 1846.
TYPE LOCALITY: California.
RANGE: Washington to Wyoming and California.
SPECIMENS EXAMINED: Klickitat County, *Howell*, June, 1879; Klickitat Hills, *Gorman*, May 16, 1901.

3. **Mimulus cusickii** (Greene).
Eunanus cusickii Greene, Pittonia **1**: 36. 1887.
TYPE LOCALITY: Malheur River, Oregon. Collected by Cusick.
RANGE: Washington and Oregon.
SPECIMENS EXAMINED: Alkaline soil near Columbia River, *Brandegee* 1011.
This species was included by Dr. Gray in *M. bigelovii* A. Gray, but it seems sufficiently distinct.

4. **Mimulus breweri** (Greene) Rydberg, Mem. N. Y. Bot. Gard. **1**: 351. 1901.
Eunanus breweri Greene, Bull. Cal. Acad. Sci. **1**: 101. 1885.
TYPE LOCALITY: "About Donner Lake," California.
Range: Washington to California and Montana.
SPECIMENS EXAMINED: Mount Rainier, *Piper* 2074; Simcoe Hills, *Howell* 297; Klickitat Meadows, *Flett* 1355; Mount Adams, *Suksdorf* 50, 488; upper Atanum, *Henderson*, August 3, 1892; Cascade Mountains, *Lyall* in 1860; North Yakima, *Henderson* 2264; Blue Mountains, *Piper* 2441.

5. **Mimulus cardinalis** Dougl.; Benth. Scroph. Ind. 28 1835.
TYPE LOCALITY: California. Collected by Douglas.
RANGE: California, Oregon, and ? Washington.
SPECIMENS EXAMINED: Yakima County, *Watt*, August, 1895.
It is possible that there has been some confusion of labels with respect to the above specimen, as we have no further evidence of its occurrence in Washington.

6. **Mimulus lewisii** Pursh, Fl. **2**: 427. *pl.* 20. 1814.
Mimulus roseus Dougl. Bot. Reg. *pl.* 1591. 1833.
TYPE LOCALITY: "On the head springs of the Missouri, at the foot of Portage Hill." Collected by Lewis.

Range: British Columbia to California, Utah, and Montana.

Specimens examined: North Yakima, *Watt*, August, 1895; Mount Stuart, *Sandberg & Leiberg* 557; Tieton River, *Cotton* 436; Mount Rainier, *Piper* 2076; *Allen* 276; Skokomish River, *Kincaid*, June 17, 1892; Cascade Mountains, latitude 49°, *Lyall* in 1859; Stevens Pass, *Whited* 1432; near Skagit Pass, *Lake & Hull* 571; Bridge Creek, *Elmer* 646; along Salmon River, *Horner* 386; near Berne, *Piper*, July 7, 1895; without locality, *Vasey* in 1889; Entiat Creek; *Mrs. Howe*.

7. **Mimulus pilosus** (Benth.) S. Wats. Bot. King Explor. 225. 1871.

Herpestis pilosa Benth.; Hook. Comp. Bot. Mag. **2**: 57. 1836.

Mimulus exilis Dur. & Hilg. Pac. R. Rep. **5**: 12. 1855.

Type locality: "North California." Collected by Douglas.

Range: Washington to California and Arizona.

Specimens examined: North Yakima, *Piper* 1800; *Watt*, August, 1895; *Henderson*, October 5, 1892; Walla Walla, *Savage* 24; Waitsburg, *Horner* 591; Almota, *Piper*, July 30, 1897; near Bingen, *Suksdorf* 2322; Rattlesnake Mountains, *Suksdorf* 421; Egbert Springs, *Sandberg & Leiberg* 357; without locality, *Brandegee* 1018.

8. **Mimulus primuloides** Benth. Scroph. Ind. 29. 1835.

Mimulus pilosellus Greene, Erythea **4**: 22. 1896.

Type locality: "Amer. boreali-occid." Collected by Douglas.

Range: Washington to California.

Specimens examined: Wenache Region, *Brandegee* 1017; Simcoe Mountains, *Howell* 298; mountains between Ellensburg and Wenache, *Whited* 717; Cascade Mountains, *Henderson*, August 4, 1892; east side Cascade Mountains, *Cooper* in 1853; without locality, *Suksdorf* 489; near Mount Adams, *Cotton* 1474, 1498.

9. **Mimulus dentatus** Nutt.; Benth. in DC. Prod. **10**: 372. 1846.

Type locality: "Ad Oregon flum." Collected by Nuttall.

Range: Washington to California in the coast region.

Specimens examined: Ilwaco, *Piper* 4917.

10. **Mimulus moschatus** Dougl.; Lindl. Bot. Reg. **13**: *pl. 1118.* 1827.

Mimulus moschatus longiflorus A. Gray, Syn. Fl. ed. 2. **2**^{1}: 447 1886.

Mimulus moschatus pallidiflorus Suksdorf, Deutsch. Bot. Monatss. **18**: 154. 1900.

Type locality: "Margins of springs in the country about the river Columbia." Collected by Douglas.

Range: British Columbia to California and Utah.

Specimens examined: Seattle, *Piper*, July 10, 1895; Tacoma, *Flett* 160; Skokomish River, *Henderson*, June 17, 1892; west Klickitat County, *Suksdorf* 490; Klickitat River, *Flett* 1159, 1179; Fort Vancouver, *Douglas* in 1825; Cascade Mountains, latitude 49°, *Lyall* in 1859; Chenowith, *Suksdorf* 2320; without locality, *Cooper;* Tieton River, *Cotton* 483; Stevens Pass, *Whited* 1431; *Sandberg & Leiberg* 762; Skagit Pass, *Lake & Hull*, August 24, 1892; Bridge Creek, *Elmer*, September, 1897; Horseshoe Basin, *Elmer* 745; Blue Mountains, *Piper* 2411; *Lake & Hull* 689; without locality, *Brandegee* 1016.

11. **Mimulus langsdorfii** Donn; Sims, Bot. Mag. *pl. 1501.* 1812.

Mimulus guttatus DC. Cat. Monsp. 127. 1813.

Type locality: Unalaska.

Range: Alaska to California and New Mexico.

Specimens examined: Montesano, *Heller* 3986, 4006; Grays Harbor, *Lamb* 1065; Orcas Island, *Lyall* in 1858; Coupeville, *Gardner* 221; Cascade Mountains, latitude 49°, *Lyall* in 1859; Skokomish Valley, *Kincaid;* Tacoma, *Flett;* Silverton, *Bouck* 140; Klickitat River, *Flett* 1145, 1149; Tieton River, *Cotton* 459; Rattlesnake Mountains, *Cotton* 417; Cold Creek, *Cotton* 394; Ellensburg, *Whited* 476; Wenache, *Whited;* west Klickitat County *Suksdorf* 2136, 202, 475, 473; Muckleshoot, *Dr. Ruhn;* Spanaway Lake, *Piper* 2085;

Manor, *Piper;* Wilson Creek, *Lake & Hull;* Nason City, *Sandberg & Leiberg* 618; Coulee City, *Lake & Hull* 570; Fresh Lake, *McKay* 11; Union Flat, *Piper*, July 9, 1901; Wawawai, *Hull; Elmer* 777.

12. **Mimulus alpinus** (A. Gray).
Mimulus luteus alpinus A. Gray, Proc. Acad. Phila. **1863**: 71. 1863.
Mimulus scouleri caespitosus Greene, Pittonia **2**: 22. 1889.
Mimulus caespitosus Greene, Journ. Bot. **24**: 8. 1895.
Type locality: "Alpine region of the Rocky Mts." Collected by Parry.
Range: British Columbia to Colorado and California.
Specimens examined: Mount Rainier, *Flett* 288; *Piper* 2070; *Allen; Greene* in 1889; Mount Adams, *Suksdorf* 479, 418; Bridge Creek, *Elmer* 642; Horseshoe Basin, *Lake & Hull* in 1892.

13. **Mimulus microphyllus** Benth. in DC. Prod. **10**: 371. 1846.
Mimulus luteus depauperatus A. Gray, Bot. Cal. **1**: 567. 1880.
Type locality: "In rupibus ad flumen Oregon." Collected by Douglas.
Range: Washington to California.
Specimens examined: Klickitat River, *Suksdorf* 478; *Flett* 1146; west Klickitat County, *Suksdorf* 477, 2321.

14. **Mimulus implexus** Greene, Journ. Bot. **33**: 8. 1895.
Mimulus tilingii Regel, err. det. Greene, Bull. Cal. Acad. **1**: 110. 1885.
Type locality: "Higher Sierra Nevada of California."
Range: Washington to California.
Specimens examined: Olympic Mountains, *Piper* 2177; *Elmer* 2583; Mount Adams, *Suksdorf* 471, 472.

15. **Mimulus nasutus** Greene, Bull. Cal. Acad. **1**: 112. 1885.
Type locality: "In Sonoma County, Cal. at Knight's Valley and Skagg's Springs."
Range: Washington and Idaho to California.
Specimens examined: Orcas Island, *Lyall* in 1858; upper Naches River, *Henderson* in 1892; west Klickitat County, *Suksdorf* 202, 419, 480, 476, 481; Rock Lake, *Sandberg & Leiberg* 110a; Almota, *Piper* 2783; Wenache Mountains, *Whited* 1363.

16. **Mimulus alsinoides** Dougl.; Benth. Scroph. Ind. 29. 1835.
Mimulus alsinoides minimus Benth. loc. cit.
Type locality: "America boreali-occid." Collected by Douglas.
Range: British Columbia to California.
Specimens examined: Whidby Island, *Gardner* 223; Orcas Island, *Lyall* in 1858; Mount Adams, *Suksdorf* 483; west Klickitat County, *Suksdorf* 420, 484; Cascade Mountains to Fort Colville, *Lyall* in 1860; mouth of the Columbia, *Scouler*.

17. **Mimulus pulsiferae** A. Gray, Proc. Am. Acad. **11**: 98. 1876.
Type locality: "California in the Sierra and Indian Valleys of the Sierra Nevada."
Range: Middle California to Klickitat County, Washington.
Specimens examined: Glenwood, *Flett* 1163; Klickitat River, *Flett* 1148; Falcon Valley, *Suksdorf*, 486 and June 10, July 30, 1885.

18. **Mimulus breviflorus** Piper, Bull. Torr. Club **28**: 45. 1901.
Type locality: Pullman, Washington.
Range: Washington, Oregon, and Idaho.
Specimens examined: Falcon Valley, *Suksdorf* 793, 485; west Klickitat County, *Suksdorf* 203; Ellensburg, *Whited* 652; Spokane, *Piper* 2764, 2640; Waitsburg, *Horner* 592; Blue Mountains, *Piper* 2440; Pullman, *Piper* 1858; Wawawai, *Elmer* 774.

19. **Mimulus suksdorfii** A. Gray, Syn. Fl. ed 2. 2^1: 450. 1886.
Type locality: Mt. Paddo (Adams). Collected by Suksdorf.

RANGE: Washington to Utah and California.
SPECIMENS EXAMINED: Mount Adams, *Suksdorf* 487.

20. **Mimulus pedunculari**s Dougl.; Benth. Scroph. Ind. 29. 1835.
TYPE LOCALITY: "America boreali-occidentalis." Collected by Douglas.
RANGE: Eastern Washington, Eastern Oregon, and Idaho.
SPECIMENS EXAMINED: West Klickitat County, *Suksdorf;* Trout Lake, *Suksdorf;* Falcon Valley, *Suksdorf;* Wenache, *Whited;* Rock Lake, *Sandberg & Leiberg* 114; Wawawai, *Elmer* 752; Almota, *Piper;* Toppenish, *Griffiths & Cotton* 796; Prosser, *Griffiths & Cotton* 651.

21. **Mimulus floribundus** Dougl.; Lindl. Bot. Reg. **13:** *pl. 1125.* 1827.
Mimulus serotinus Suksdorf, Deutsch. Bot. Monatss. **18:** 154. 1900.
TYPE LOCALITY: "On moist rocks in the interior of the districts of the Columbia River." Collected by Douglas.
RANGE: British Columbia to California and Colorado."
SPECIMENS EXAMINED: Ellensburg, *Whited* 847; North Yakima, *Henderson* in 1892; west Klickitat County, *Suksdorf* 205, 2185; Wilson Creek, *Lake & Hull* 709; Sprague, *Henderson*, May 30, 1892; bars Touchet River, *Horner* 266; Spokane, *Watson* 309; *Piper; Sandberg, Heller, & MacDougal* 926; without locality, *Dr. Cooper;* Wawawai, *Elmer* 754; Almota, *Piper*, June 28, 1894.

MIMULUS JUNGERMANNIOIDES Suksdorf, Deutsch. Bot. Monatss. **18:** 154. 1900. Type locality, near Bingen, Klickitat County, Washington. Specimens examined, near Bingen, *Suksdorf* 1470. This species is very close to the preceding, but it is perhaps distinguishable by its broader and shorter, more deeply cordate leaves. According to Suksdorf it perennates by means of bud-like tubers formed on the tips of stolon-like branches.

MELAMPYRUM.

1. **Melampyrum lineare** Lam. Encyc. **4:** 22. 1797.
Melampyrum americanum Michx. Fl. **2:** 16. 1803.
TYPE LOCALITY: "Amerique septentrionale."
RANGE: Washington to Hudson Bay, southward to North Carolina.
SPECIMENS EXAMINED: Box Canyon, *Kreager* 409.

RHINANTHUS.

1. **Rhinanthus crista-galli** L. Sp. Pl. **2:** 603. 1753.
TYPE LOCALITY: European.
RANGE: Washington to New England, north to Alaska and Labrador. Europe. Asia.
SPECIMENS EXAMINED: Whidby Island, *Gardner* 224; Admiralty Head, *Piper* in 1898; Cascade Mountains, latitude 49°, *Lyall;* Loomis, *Elmer* 596; Spokane County, *Suksdorf;* Palouse City, *Henderson;* Fort Vancouver, *Scouler*, according to Hooker.
ZONAL DISTRIBUTION. Transition.

PEDICULARIS.

Leaves lanceolate, doubly-crenulate.............................. 6. *P. racemosa.*
Leaves pinnately parted.
  Flowers purple.
    Corolla beakless; seashore plant.......................... 3. *P. parviflora.*
    Corolla beaked; alpine plants.
      Beak long and filiform, curved....................... 1. *P. groenlandica*
      Beak short and conical.............................. 2. *P. ornithorhyncha.*
  Flowers yellowish or whitish.
    Corolla yellow, with a slender inrolled beak............... 4. *P. contorta.*
    Corolla whitish, with a broad hood-like beak.............. 5. *P. bracteosa.*

1. Pedicularis groenlandica surrecta (Benth.) Piper, Mazama **2**: 100. 1901.

Pedicularis surrecta Benth.: Hook. Fl. Bor. Am. **2**: 107. 1858.

Type locality: "N. West Interior." Collected by Douglas.

Range: British Columbia and Saskatchewan to California and New Mexico.

Specimens examined: Big Creek Prairie, *Lamb* 1398; Mount Rainier, *Piper* 2072; upper Nisqually Valley, *Allen* 89; Clallam County, *Elmer* 2580; Cascade Mountains latitude 49°, *Lyall* in 1859; Stampede Pass, *Henderson*, July 26, 1892; Stevens Pass, *Sandberg & Leiberg* August, 1893, 709; Bridge Creek, *Elmer* 668.

Zonal distribution: Hudsonian.

2. Pedicularis ornithorhyncha Benth; Hook. Fl. Bor. Am. **2**: 108. 1838.

Type locality: "Mt. Rainier." Collected by Tolmie.

Range: Cascade Mountains of Washington.

Specimens examined: Mount Rainier, *Allen* 92; *Piper* 2069, 397; *Smith* in 1889: Mount Stuart, *Brandegee* 1027; Bridge Creek, *Elmer*, September, 1897; Horseshoe Basin, *Lake & Hull* 577; Entiat Creek, *Mrs. Howe;* Monte Cristo, *Misses Coffin & Goodspeed.*

Zonal distribution: Arctic.

3. Pedicularis parviflora Smith, Rees' Cycl. **26**: no. 4. 1813.

Pedicularis palustris wlassoviana Bunge; Ledeb. Fl. Ross. **3**: 283. 1849.

Pedicularis wlassoviana Stev. Monogr. 27. *pl. 9. fig. 1.* 1823.

Type locality: "On the west coast of North America." Collected by Menzies.

Range: Alaska to Labrador and Oregon. Siberia.

Specimens examined: Point Orchard, *Parker* in 1888.

4. Pedicularis contorta Benth; Hook. Fl. Bor. Am. **2**: 108. 1838.

Type locality: "Mt. Rainier." Collected by Tolmie.

Range: Washington, Oregon, and Idaho.

Specimens examined: Mount Rainier, *Piper* 2071; *Allen* 91; *Smith* in 1889: Mount Stuart, *Elmer* 1173; Stevens Pass, *Sandberg & Leiberg* 738; Blue Mountains, *Horner* 387; Wenache Mountains, *Cotton* 1704.

Zonal distribution: Arctic.

5. Pedicularis bracteosa Benth.: Hook. Fl. Bor. Am. **2**: 110. 1838.

Type locality: "Shady alpine woods of the Rocky Mountains." Collected by Drummond. "N. W. Am." Collected by Douglas.

Range: British Columbia and Saskatchewan to Colorado.

Specimens examined: Olympic Mountains, *Elmer* 2577; Mount Rainier, *Piper* 2077; *Allen* 90; Mount Stuart, *Sandberg & Leiberg* 556; Simcoe Mountains, *Howell*; Skagit Pass, *Lake & Hull* 576; Wenache Mountains, *Elmer* 443; along Twisp River, *Whited* 194; Nason City, *Sandberg & Leiberg*, July, 1893; Blue Mountains, *Piper*, July, 1896; *Horner* 134; without locality, *Brandegee;* Mount Carlton, *Kreager* 270.

Zonal distribution: Canadian and Hudsonian.

6. Pedicularis racemosa Dougl.: Hook. Fl. Bor. Am. **2**: 108. 1838.

Type locality. "Abundant on the summit of the high mountains of the Grand Rapids of the Columbia" Collected by Douglas. "Mt. Rainier." Collected by Tolmie.

Range. British Columbia to California and Colorado

Specimens examined: Silverton, *Bouck* 14; Clallam County, *Elmer* 2579; Goat Mountains, *Allen* 88, Mount Rainier, *Piper* 2073, along Twisp River, *Whited* 193; Stevens Pass, *Sandberg & Leiberg* 743, Martin, *Henderson*, July 20, 1892; Fish Lake, *Dunn*, August 8, 1900, east side Cascades, *Lyall*, without locality, *Vasey* in 1889, Lake Kalispel, *Kreager* 350.

Zonal distribution: Canadian and Hudsonian.

CASTILLEJA.

Annual; stems slender, erect; leaves entire, narrow.................. 1. *C. exilis.*
Perennials.
Bracts whitish or yellowish; galea shorter than the tube of the corolla.
Galea short and broad.................................... 2. *C. pallescens.*
Galea slender.
Pubescence harsh.................................... 3. *C. lutescens.*
Pubescence soft, pilose.
Lip one-third as long as the galea................ 4. *C. camporum.*
Lip over one-half as long as the galea............. 5. *C. levisecta.*
Bracts scarlet or crimson (occasionally yellow); galea as long or longer than the corolla tube.
Leaves and bracts cleft into linear lobes.
Stems glabrous below; bracts crimson or white........ 6. *C. oreopola.*
Stems pilose to the base; bracts scarlet.
Galea much longer than the corolla tube.......... 7. *C. rupicola.*
Galea about equaling the corolla tube............. 8. *C. angustifolia.*
Leaves and bracts entire, very rarely cleft.
Stems from slender rootstocks; bracts green, with scarlet tips.. 12. *C. suksdorfii.*
Stems from a stout caudex.
Bracts rose-purple; leaves viscid-puberulent....... 9. *C. elmeri.*
Bracts scarlet; spikes very dense.
Leaves glabrous; bracts entire.
Plants erect; leaves rather thin.......... 10. *C. miniata.*
Plant decumbent; leaves thick........... 11. *C. dixonii.*
Leaves puberulent, not viscid; bracts, or some of them, lobed or toothed................. 13. *C. crispula.*

1. **Castilleja exilis** A. Nelson, Proc. Biol. Soc. Wash. **17**: 100. 1904.
Castilleja stricta Rydberg, Mem. N. Y. Bot. Gard. **1**: 354. 1900, not DC. 1846.
TYPE LOCALITY: Ruby Valley, Nevada.
RANGE: Washington to Montana, Nevada, and Utah.
SPECIMENS EXAMINED: Yakima City, *Piper* 2845; Satus, *Elmer* 1066; Toppenish, *Griffiths & Cotton* 772; Priest Rapids, *Cotton* 1395.
ZONAL DISTRIBUTION: Upper Sonoran.

2. **Castilleja pallescens** (A. Gray) Greenman, Bot. Gaz. **25**: 266. 1898.
Orthocarpus pallescens A. Gray, Proc. Am. Acad. **7**: 384. 1868.
Euchroma pallescens Nutt.; A. Gray, loc. cit. as synonym.
Orthocarpus parryi A. Gray, Am. Nat. **8**: 214. 1874.
TYPE LOCALITY: None given.
RANGE: Washington and Oregon to Montana and Wyoming.
SPECIMENS EXAMINED: Columbia River, latitude 46° to 49°, *Lyall* in 1860; Wenache, *Whited* 1079; Ellensburg, *Piper* 2703; Klickitat River, *Flett* 1144; Mount Adams, *Flett* 1177; *Henderson*, 2269, August 9, 1892; Pasco, *Hindshaw* 29; *Piper*, May 26, 1899; Kittitas Mountains, *Whited*, May 27, 1896; Loomis, *Elmer* 569, 593; Sprague, *Sandberg & Leiberg*, June, 1893; Coulee City, *Henderson*, July 11, 1892; Spangle, *Piper*, June 24, 1899; Douglas County, *Henderson* 2267; Spokane County, *Henderson* 2268; without locality, *Vasey* in 1889; Coulee City, *Piper* 3852.
ZONAL DISTRIBUTION: Upper Sonoran and Arid Transition.

Geyer's 291 referred by Hooker to *C. septentrionalis* Lindl. is *C. pallescens*. The "*C. pallida* Kunth" of Cooper's Report, page 67, is probably this species.

3. **Castilleja lutescens** (Greenman) Rydberg, Mem. N. Y. Bot. Gard. **1**: 359. 1900.

Castilleja pallida lutescens Greenman, Bot. Gaz. **25**: 265. 1898.

TYPE LOCALITY: "Prairies, Spokane Co., Washington." Collected by Suksdorf. The above is the first cited specimen.

RANGE: Idaho. British Columbia.

SPECIMENS EXAMINED: Sprague, *Sandberg & Leiberg* 141; Kamiak Butte, *Piper* 3086; Pullman, *Elmer* 816; *Lake*, June, 1892; Mount Carlton, *Kreager* 149.

ZONAL DISTRIBUTION: Arid Transition.

4. **Castilleja camporum** (Greenman) Howell, Fl. N. W. Am. 532. 1901.

Castilleja pallida camporum Greenman, Bot. Gaz. **25**: 266. 1898.

Castilleja lutea Heller, Bull. Torr. Club **25**: 268. 1898.

TYPE LOCALITY: "Low prairies, Spokane Co., Washington." Collected by Suksdorf. (The first cited specimen.)

RANGE: Washington, Oregon, and Idaho.

SPECIMENS EXAMINED: Rock Creek, *Sandberg & Leiberg* 80; Silver Lake, *Henderson*; Spokane, *Henderson* 2266; Spangle, *Piper* 2833, 3540; Pullman, *Piper* 2826; *Lake & Hull*.

ZONAL DISTRIBUTION: Arid Transition.

5. **Castilleja levisecta** Greenman, Bot. Gaz. **25**: 268. 1898.

TYPE LOCALITY: "Mill plain, Washington," in Clarke County. Collected by Howell; the first specimen cited.

RANGE: Western Washington and Vancouver Island.

SPECIMENS EXAMINED: Whidby Island, *Gardner* 236; Port Ludlow, *Binns*, June 15, 1890; Roy, *Allen* 83; Mill Plain, *Howell* 279; Admiralty Head, *Piper*, April, May, 1898; Seattle, *Hindshaw*, July, 1897.

ZONAL DISTRIBUTION: Humid Transition.

6. **Castilleja oreopola** Greenman, Bot. Gaz. **25**: 264. 1898.

Castilleja miniata alpina Suksdorf, Deutsch. Bot. Monatss. **18**: 155. 1900.

TYPE LOCALITY: "In damp ground, on Mt. Adams (Mt. Paddo), Washington, altitude 1840 to 2150 m." Collected by Suksdorf.

RANGE: Mountains of western Washington.

SPECIMENS EXAMINED: Olympic Mountains, *Piper*, September, 1895; Mount Rainier, *Flett* 2197, 294; *Piper* 2081; *Allen* 95a; Goat Mountains, *Allen* 134; Mount Adams, *Suksdorf* 2946; near Skagit Pass, *Lake & Hull*, August 24, 1892; Horseshoe Basin, *Elmer* 696; Bridge Creek, *Elmer* 696; Clallam County, *Elmer* 2590.

ZONAL DISTRIBUTION: Arctic.

7. **Castilleja rupicola** Piper, Erythea **6**: 45. 1898.

TYPE LOCALITY: "On perpendicular cliffs, Paradise Valley, Mount Rainier, Washington."

RANGE: Known only from Mount Rainier.

SPECIMENS EXAMINED: Mount Rainier, *Piper* 2075; *Allen*; *Flett* 2128.

ZONAL DISTRIBUTION: Hudsonian.

8. **Castilleja angustifolia** (Nutt.) G. Don, Hist. Dichl. Pl. **4**: 616. 1837.

Castilleja douglasii Benth. in DC. Prod. **10**: 530. 1846.

Castilleja desertorum Geyer; Hook. Journ. Bot. and Kew. Misc. **5**: 258. 1853.

Euchroma angustifolia Nutt. Journ. Acad. Phila. **7**: 46. 1834.

TYPE LOCALITY: "Native in dry prairies on the borders of the Little Goddin River, near the source of the Columbia."

RANGE: British Columbia to California and Colorado.

SPECIMENS EXAMINED: Kamiak Butte, *Moore* 2324.

This species and its subspecies have very generally been confused with the very distinct Alaskan *C. parviflora* Bong.

SUBSPECIES OF CASTILLEJA ANGUSTIFOLIA.

Leaves entire .... 8a. *C. angustifolia whitedii.*
Leaves cleft.
Stems sparingly pilose.
Leaves lanceolate to oblong-lanceolate, 2 to 5 cm. long .... 8b. *C. angustifolia bradburii.*
Leaves ovate-oblong to obovate, 1 to 2.5 cm. long .. 8c. *C. angustifolia abbreviata.*
Stems densely pilose.
Leaves harshly pubescent; stems 40 to 50 cm. high; leaves short, not spreading.................... 8d. *C. angustifolia hispida.*
Leaves less harsh; stems 10 to 30 cm. high; leaves slender, spreading .... 8. *C. angustifolia.*

8a. Castilleja angustifolia whitedii Piper, Bull. Torr. Club **27**: 399. 1900.

TYPE LOCALITY: Wenache, Washington.

SPECIMENS EXAMINED: Wenache, *Whited* 1141.

8b. Castilleja angustifolia bradburii (Nutt.) Fernald, Erythea **6**: 48. 1898.

Euchroma bradburii Nutt. Journ. Acad. Phila. **7**: 47. 1834.

Castilleja bradburii G. Don, Hist. Dichl. Pl. **4**: 616. 1837.

TYPE LOCALITY: "Little Goddin River, sources of the Columbia."

RANGE: British Columbia, Washington, and Idaho.

SPECIMENS EXAMINED: Olympic Mountains, *Piper*, August, 1895; Orcas Island, *Lyall;* Tacoma, *Flett* 104; Easton, *Henderson*, June 11, 1892; Bear Prairie, near Mount Rainier, *Allen* 133; Klickitat River, *Flett* 1151; Clealum, *Whited* 362; Mount Adams, *Flett* 1162; Roy, *Allen* 84; Wenache, *Whited* 5; Spokane Valley, *Lyall;* without locality, *Vasey* 451.

ZONAL DISTRIBUTION: Arid Transition.

8c. Castilleja angustifolia abbreviata Fernald, Erythea **6**: 49. 1898.

TYPE LOCALITY: Olympic Mountains, Washington.

RANGE: Olympic Mountains.

SPECIMENS EXAMINED: Olympic Mountains, *Piper* 2175; Clallam County, *Elmer* 2582.

8d. Castilleja angustifolia hispida (Benth.) Fernald, Erythea **6**: 48. 1898.

Castilleja hispida Benth.; Hook. Fl. Bor. Am. **2**: 105. 1838.

TYPE LOCALITY: "Common on dry soils of the NW. coast, especially about Fort Vancouver." Collected by Douglas, by Scouler, by Tolmie, and by Gairdner.

RANGE: Washington to California and Colorado.

SPECIMENS EXAMINED: Kamiak Butte, *Piper* 3096, 3095, 3097; Blue Mountains, *Piper* 2435; Almota, *Piper* 2323, 2798.

9. Castilleja elmeri Fernald, Erythea **6**: 51. 1898.

TYPE LOCALITY: "On Wenatchee Mts., 19.3 km. north of Ellensburg, Washington."

RANGE: Mount Stuart and Wenache Mountains.

SPECIMENS EXAMINED: Mount Stuart, *Elmer* 1179, 1180; Wenache Mountains, *Elmer* 457.

10. Castilleja miniata Dougl.; Hook. Fl. Bor. Am. **2**: 106. 1838.

TYPE LOCALITY: "Blue Mountains, N. W. America." Collected by Douglas and by Tolmie.

RANGE: Alaska to California and Colorado.

SPECIMENS EXAMINED: Olympic Mountains, *Lamb* 1160; Fairhaven, *Piper*, September, 1892, 2807; Silverton, *Bouck* 144; Mount Rainier, *Piper* 2082; Mount Adams, *Flett* 1143; Klickitat River, *Flett* 1150; Tacoma, *Flett* 46; Peshastin, *Sandberg & Leiberg* 616; Wenache, *Whited* 157; Atanum Springs, *Watt*, August, 1895; Horseshoe Basin, *Lake & Hull* 573; Nason Creek, *Sandberg & Leiberg* 616; Wilbur, *Henderson*, July 12, 1892; Pullman, *Piper*

1668; Mount Adams, *Suksdorf;* Skamania County, *Suksdorf;* Cascade Mountains, latitude 49°, *Lyall;* Falcon Valley, *Suksdorf* 599; Seattle, *Dixon* in 1898; Quinault, *Dixon* in 1898; Kettle Falls, *Watson* in 1880; Puget Sound, *Cooper;* Ellensburg, *Whited* 700.

Zonal distribution: Upper Sonoran to Hudsonian.

Narrow-leaved forms of this species have erroneously been referred to *C. linariaefolia* Benth.

11. Castilleja dixonii Fernald, Erythea 7: 122. 1899.

Type locality: "Abundant on the seashore, in gravelly or sandy soil, usually just above high-water mark, Quinault Indian Agency, Washington."

Range: Ocean coast of Washington.

Specimens examined: Quinault, *Dixon*, July 17, 1898; Grays Harbor, *Wilkes Expedition;* Ilwaco, *Piper* 4957.

Zonal distribution: Humid Transition.

This is very closely related to *C. miniata* Douglas, and is perhaps merely a seashore form of it.

12. Castilleja suksdorfii A. Gray, Proc. Am. Acad. 22: 311. 1887.

Type locality: "Alpine meadows and springs of Mount Adams, Washington, at 6,000 to 7,000 feet of elevation." Collected by Suksdorf.

Range: Mount Adams and vicinity.

Specimens examined: Mount Adams, *Suksdorf* 198, 600; mountains of Skamania County, *Suksdorf;* Hell Roaring River, *Cotton* 1506.

13. Castilleja crispula sp. nov.

Perennial from a stout woody crown; stems erect or nearly so, 20 to 30 cm. high; whole herbage sparsely crisp-puberulent; leaves lanceolate, acute, broadest near the sessile base, 3-nerved, 2 to 4 cm. long, all entire or the uppermost with a few teeth; spike short and dense; bracts broader than the leaves, scarlet-tipped, all or at least the upper ones few-toothed near the apex; calyx villous, about equally cleft before and behind, each lateral segment cleft about midway into two attenuate-lanceolate, acute, lobes; corolla about 3 cm. long, the glandular, puberulent galea green except a thin scarlet margin, nearly straight, as long as the sparsely pilose tube; lip small, the three teeth saccate-involute, acute; ovary elliptic-acuminate; stigma 2-lobed.

A species very close to *C. miniata* Dougl. differing in its puberulent herbage and the dentate bracts.

Specimens have been examined as follows, all from Washington: Mount St. Helens, *Coville*, 768, July 18, 1898, sheet 380051 in the National Herbarium (type); same locality, *L. L. Goodwin*, 26, July 13, 1903.

ORTHOCARPUS.

Perennial; galea hooded, obtuse; lip obscurely saccate.............. 1. *O.* ***pilosus.***
Annual.
Lobes of lower lip of corolla well developed.
Galea bearded on the back; filaments pubescent........... 2. *O.* ***purpurascens.***
Galea naked; filaments smooth.
Spike short and dense; bracts with broad obtuse white lobes.. 3. *O.* ***castilleoides.***
Spike slender; bracts with slender lobe............... 4. *O.* ***attenuatus.***
Lobes of lower lip of corolla very small.
Lip simply saccate, scarcely larger than the galea.
Bracts very different from the leaves, the upper ones entire.
Galea hooked at the tip; bracts obtuse.

Corolla minutely pubescent; herbage scabrous and sparsely hirsute-ciliate.................. 5. *O. tenuifolius.*
Corolla glabrous or minutely granular-puberulent; herbage puberulent, not at all hirsute-ciliate.................................... 6. *O. imbricatus.*
Galea straight not hooked, its tip glandular pubescent; bracts all acute......................... 7. *O. barbatus.*
Bracts less different from the leaves, all 3 to 5-lobed.
Flowers purple; leaves all 3-cleft.................. 8. *O. bracteosus.*
Flowers yellow; leaves mostly entire.............. 9. *O. luteus.*
Lip with 3 conspicuous swellings, much larger than the galea.
Flowers very small 4 to 6 mm. long, dull purple; leaves pinnatifid or bipinnatifid into filiform segments...... 10. *O. pusillus.*
Flowers larger 12 to 20 mm. long; leaves simply pinnate with slender lobes or entire.
Corolla sulphur-yellow, 2 to 2.5 cm. long; anthers 1-celled .... 11. *O. erianthus.*
Corolla white, about 1 cm. long; anthers 2-celled.. 12. *O. hispidus.*

1. **Orthocarpus pilosus** S. Wats. Bot. King Explor. 231. 1871.

Type locality: "In Washoe Valley, Nevada."

Range: Washington to California and Nevada.

Specimens examined: Mount Adams, *Suksdorf*, September 2, 1904 (an unusually glandular form).

2. **Orthocarpus purpurascens** Benth. Scroph. Ind. 13. 1835.

Type locality: California. Collected by Douglas.

Range: Oregon and California.

Specimens examined: Seattle (introduced), *Piper*, June 4, 1891.

3. **Orthocarpus castilleoides** Benth. Scroph. Ind. 13. 1835.

Type locality: California. Collected by Douglas.

Range: On the seacoast, Puget Sound to Monterey.

Specimens examined: Grays Harbor, *Wilkes Expedition;* Oyhut, *Lamb* 1269; Whidby Island, *Gardner* 239; Lillewaup, *Piper* in 1890; Astoria, *Cooper;* Everett, *Piper* 4987; Copalis, *Conard* 385.

Zonal distribution: Humid Transition.

4. **Orthocarpus attenuatus** A. Gray, Pac. R. Rep. **4**: 121. 1857.

Type locality: Corte Madera, California.

Range: British Columbia to Middle California.

Specimens examined: Whidby Island, *Gardner*, 225; Lopez Island, *Lyall* in 1858; near Tacoma, *Flett* 191, 2123, May 5, 1895; Nisqually, *Wilkes Expedition.*

Zonal distribution: Humid Transition.

5. **Orthocarpus tenuifolius** (Pursh) Benth. in DC. Prod. **10**: 536. 1846.

Bartsia tenuifolia Pursh, Fl. **2**: 429. 1814.

Type locality: "On the banks of Clark's River." Collected by Lewis. The exact locality is near the mouth of the Lolo fork of the Bitterroot River, Montana.

Range: British Columbia to Oregon and west Montana.

Specimens examined: Wilson Creek, *Sandberg & Leiberg*, June, 1893; Wilbur, *Henderson*, July 12, 1892; Douglas County, *Spillman*, May, 1896; Cow Creek, *Lyall;* Spokane County, *Suksdorf* 425; Spokane, *Dewart;* Pullman, *Piper* 1666; Clarks Springs *Kreager* 18; Okanogan to Grand Coulee, *Wilkes Expedition.*

Zonal distribution: Arid Transition.

6. **Orthocarpus imbricatus** Torr.: S. Wats. Bot. King Explor. 458. 1871.
Orthocarpus olympicus Elmer, Bot. Gaz. **36**: 60. 1903.
Type locality: "In the Cascade Mts., Oregon." Collected by Newberry.
Range: Washington to California.
Specimens examined: Olympic Mountains, *Elmer* 2574; *Flett* 85.

7. **Orthocarpus barbatus** Cotton, Bull. Torr. Club **29**: 574. 1902.
Type locality: "At the junction of Crab and Wilson creeks, Douglas County," Washington. Collected by Sandberg and Leiberg.
Range: Central Washington.
Specimens examined: Wilson Creek, *Sandberg & Leiberg* 234; Moses Lake, *Griffiths & Cotton* 613; Fort Okanogan, *Wilkes Expedition*.
Zonal distribution: Upper Sonoran.

8. **Orthocarpus bracteosus** Benth. Scroph. Ind. 13. 1835.
Type locality: "Ad flum. Columbia." Collected by Douglas.
Range: British Columbia to northern California.
Specimens examined: Falcon Valley, *Suksdorf* 167; without locality, *Cooper*; Seattle, *Piper*; east of the Cascades, *Wilkes Expedition*.

9. **Orthocarpus luteus** Nutt. Gen. **2**: 57. 1818.
Orthocarpus strictus Benth. Scroph. Ind. 12. 1835.
Type locality: Near Fort Mandan, North Dakota.
Range: British Columbia to Saskatchewan and California.
Specimens examined: Parrott, *Lake & Hull* 701; "high timbered regions of Spokane," *Spalding*; Colville, *Lyall*; Usk, *Kreager* 359.
Zonal distribution: Arid Transition.

10. **Orthocarpus pusillus** Benth. Scroph. Ind. 12. 1835.
Type locality: California. Collected by Douglas.
Range: British Columbia to California west of the Cascades and Sierras.
Specimens examined: Montesano, *Heller* 3877; Clallam County, *Elmer* 2592; Seattle, *Piper*, May, 1892; Tacoma, *Flett* 8.
Zonal distribution: Humid Transition.

11. **Orthocarpus erianthus** Benth. Scroph. Ind. 12. 1835.
Type locality: California. Collected by Douglas.
Range: California.
Specimens examined: West Seattle, *Piper* 552, introduced from California.

12. **Orthocarpus hispidus** Benth.; DC. Prod. **10**: 535. 1846.
Type locality: "Ad flumen Oregon." Collected by Douglas.
Range: British Columbia to Idaho and northern California.
Specimens examined: Silver Lake, *Henderson* 2265; Falcon Valley, *Suksdorf* 465, 466; Wenache Region, *Brandegee* 1023; Ellensburg, *Whited* 497; Sprague, *Sandberg & Leiberg* 153; Spokane, *Piper*, July 2, 1896; *Henderson* 2265; Pullman, *Piper*, 1665, July 28, 1894; *Elmer* 832; without locality, *Vasey* 470; Colville to Spokane, *Wilkes Expedition*.
Zonal distribution: Arid Transition.

ADENOSTEGIA.

1. **Adenostegia capitata** (Nutt.) Greene, Pittonia **2**: 180. 1891.
Cordylanthus capitatus Nutt.: DC. Prod. **10**: 597. 1846.
Type locality: "In Nova California." Collected by Nuttall.
Range: Washington to Idaho and Nevada.
Specimens examined: Mount Adams, *Flett* 1161; Falcon Valley, *Suksdorf*, August, 1880; Simcoe Mountains, *Howell*, July, 1880; Tampico, *Henderson*, July 31, 1892; without locality, *Brandegee* 1024; without locality, *Vasey* in 1889.

ZONAL DISTRIBUTION: Arid Transition.

The Brandegee specimen was referred by Gray erroneously to *A. ramosa* (Nutt.), a species not known from Washington.

DIGITALIS.

1. **Digitalis purpurea** L. Sp. Pl. **2**: 621. 1753. FOXGLOVE.

TYPE LOCALITY: "In Europae australiore."

SPECIMENS EXAMINED: Union City, *Piper*. Abundantly introduced along the lower Columbia River.

VERBENACEAE. VERBENA FAMILY.

VERBENA.

Stems prostrate or decumbent; bracts exceeding the flowers............ 1. *V. bracteosa.*
Stems erect; bracts shorter than the flowers.
  Herbage densely soft-pubescent.................................. 2. *V. stricta.*
  Herbage glabrous or nearly so.................................. 3. *V. hastata.*

1. **Verbena bracteosa** Michx. Fl. **2**: 13. 1803.

TYPE LOCALITY: "In regione Illinoiensi et in urbe Nashville."

RANGE: Washington to California, Wisconsin and Florida.

SPECIMENS EXAMINED: Cascade Mountains to Colville, *Lyall* in 1860; Egbert Springs, *Sandberg & Leiberg* 340; North Yakima, *Watt*, August, 1895; Prosser, *Henderson*, May 26, 1892; Wenache, *Whited* 1373; Almota, *Lake & Hull* 606; Wawawai, *Piper* 1542; Mission, *Kreager*, August 22, 1902; Meyers Falls, *Kreager* 474; without locality, *Vasey* in 1889; Prosser, *Cotton* 621.

ZONAL DISTRIBUTION: Upper Sonoran and Arid Transition.

2. **Verbena stricta** Vent. Descr. Pl. Jard. Cels. *pl. 53*. 1800.

TYPE LOCALITY: Illinois.

RANGE: Washington to Ohio and Texas.

SPECIMENS EXAMINED: Meyers Falls. *Kreager* 475.

3. **Verbena hastata** L. Sp. Pl. **1**: 20. 1753.

Verbena paniculata Lam. Encyc. **8**: 548. 1808.

TYPE LOCALITY: "Habitat in Canadae humidis."

RANGE: Washington to Canada, New Mexico, and Florida.

SPECIMENS EXAMINED: Ellensburg, *Piper*, July 9, 1897; North Yakima, *Watt*, August, 1895; *Piper*, August 6, 1894; Alma, *Elmer* 537; Rock Lake, *Lake & Hull* 605; Almota, *Piper*, August 26, 1894, Meyers Falls, *Kreager* 469; Toppenish, *Cotton* 787.

ZONAL DISTRIBUTION: Upper Sonoran.

SOLANACEAE. NIGHTSHADE FAMILY.

Fruit a berry; corolla campanulate or rotate.
  Corolla campanulate, calyx campanulate becoming large and bladdery.. PHYSALIS.
  Corolla rotate; calyx small.. SOLANUM.
Fruit a capsule; corolla funnelform.
  Capsule prickly, leaves dentate in ours.............................. DATURA.
  Capsule not prickly; leaves entire.................................. NICOTIANA.

PHYSALIS.

Herbage pubescent; fruiting calyx sharply 5-angled.................... 1. *P. pubescens.*
Herbage glabrous, fruiting calyx obscurely 5 to 10-angled.............. 2. *P. ixocarpa.*

1. **Physalis pubescens** L. Sp. Pl. **1**: 183. 1753.

TYPE LOCALITY. Habitat in India utraque.

RANGE: California to Iowa, New York, and Florida.

SPECIMENS EXAMINED: North Yakima, *Henderson* 2496.

2. Physalis ixocarpa Brot.; Hornem. Hort. Hafn. Suppl. 26. 1819.

TYPE LOCALITY: "Habitat unknown." Probably originally from Mexico.

SPECIMENS EXAMINED: Near Bingen, *Suksdorf* 2284.

SOLANUM.

Perennial; climbing vine; leaves 3-lobed or 3-divided..................	2. *S. dulcamara.*
Annuals; erect or prostrate.	
Plant armed with prickles; flowers yellow; leaves pinnatifid........	1. *S. rostratum.*
Plant not prickly.	
Stems prostrate; leaves deeply pinnatifid......................	3. *S. triflorum.*
Stems erect; leaves ovate, repand or entire....................	4. *S. nigrum.*

1. Solanum rostratum Dunal, Sol. 234. 1813.

TYPE LOCALITY: "In horto Monspeliensi cultum."

RANGE: Colorado and Nebraska to Texas.

SPECIMENS EXAMINED: Walla Walla, *Piper*, August 13, 1897 (introduced).

2. Solanum dulcamara L. Sp. Pl. **1**: 185. 1753. BITTERSWEET.

TYPE LOCALITY: European.

SPECIMENS EXAMINED: Parker, *Dunn*, August 8, 1901; North Yakima, *Watt*, August, 1895; *Piper* 1889; Rock Lake, *Lake & Hull* 583; Spokane, *Kreager* 545; Selah Valley, *Cotton* 882.

3. Solanum triflorum Nutt. Gen. **1**: 128. 1818.

TYPE LOCALITY: "Near Fort Mandan." Collected by Nuttall.

RANGE: Washington to Saskatchewan and New Mexico.

SPECIMENS EXAMINED: Columbia River, *Henderson* 2495; Ellensburg, *Whited*, July, 1897; North Yakima, *Piper* 1806.

ZONAL DISTRIBUTION: Upper Sonoran.

4. Solanum nigrum L. Sp. Pl. **1**: 186. 1753.

TYPE LOCALITY: "Habitat in Orbis totius cultis."

RANGE: Temperate North America.

SPECIMENS EXAMINED: Cascade Mountains latitude 49°, *Lyall* in 1859; Tacoma, *Flett* 67; west Klickitat County, *Suksdorf* 1480, 2317, 2318; North Yakima, *Piper* 1787, Ophir, *Elmer* 525; Wawawai, *Elmer*, June, 1897; Squaw Creek, *Cotton* 871.

ZONAL DISTRIBUTION: Upper Sonoran and Transition.

DATURA.

Flowers white; prickles of the fruit unequal, the lower shorter........	1. *D. stramonium.*
Flowers purplish, prickles of the fruit equal..........................	2. *D. tatula*

1. Datura stramonium L. Sp. Pl. **1**: 179. 1753. JIMSON WEED.

TYPE LOCALITY: "Habitat in America, nunc vulgaris per Europam".

Reported in Suksdorf's list, but we have seen no Washington specimens.

2. Datura tatula L. Sp. Pl. ed. 2. **1**: 256. 1762.

TYPE LOCALITY: Unknown.

SPECIMENS EXAMINED: Pullman, *Piper*, September 8, 1894; near Wawawai, *Piper* in 1902.

NICOTIANA.

1. **Nicotiana attenuata** Torr.; S. Wats. Bot. King. Explor. 276. *pl.* 27. 1871.

Type locality: "Rather common in the valleys and dry lower canyons of Nevada."

Range: Washington to California and Colorado.

Specimens examined: Wenache, *Elmer* 478; *Whited* 1329; North Yakima, *Mrs. Steinweg* in 1894; *Watt*, August, 1895; west Klickitat County, *Suksdorf* 201; Bingen, *Suksdorf* 1482; Rattlesnake Mountains, *Cotton* 477; Pasco, *Henderson*, June, 1892; Crab and Wilson creeks, *Sandberg & Leiberg* 317; near Moses Coulee, *Lake & Hull* 584; Almota, *Piper*, September 9, 1896, August 26, 1894; without locality, *Vasey* in 1889; Moxee to North Yakima, *Griffiths & Cotton* 49.

Zonal distribution: Upper Sonoran.

OROBANCHACEAE. Broomrape Family.

Anther cells not separated, their bases rounded	Boschniakia.
Anther cells separated below, the bases mucronate.	
No bracts on the calyx or the elongated peduncles	Thalesia.
One or two bracts on the calyx or the short pedicel	Orobanche.

THALESIA.

Calyx lobes subulate, longer than the tube	1. *F. uniflora.*
Calyx lobes triangular, shorter than the tube	2. *F. fasciculata.*

1. **Thalesia uniflora** (L.) Britton, Mem. Torr. Club **5**: 298. 1894.

Orobanche uniflora L. Sp. Pl. **2**: 633. 1753.
Aphyllon uniflorum Torr. & Gray in Gray, Man. ed. **1**. 290. 1848.
Thalesia purpurea Heller, Bull. Torr. Club **24**: 313. 1897.
Aphyllon minutum Suksdorf, Deutsch. Bot. Monatss. **18**: 155. 1900.
Aphyllon sedi Suksdorf, loc. cit.

Type locality: "Habitat in Virginia."

Range: British Columbia to Newfoundland, Virginia, Texas, and California.

Specimens examined: Clallam County, *Elmer* 2555; Whidby Island, *Gardner* 242; Baldy Creek, *Lamb* 1331; Tacoma, *Flett* 198; Wenache Mountains, *Elmer* 463; Yakima, *Henderson*, May 25, 1892; Ellensburg, *Whited* 327; Semiamoo Bay, *Lyall* in 1858; Kittitas, *Lyall* in 1860; Bingen, *Suksdorf* 2323; Skamania County, *Suksdorf* 2130; upper Naches River, *Henderson*, June 15, 1892; west Klickitat County, *Suksdorf* 2089; Blue Mountains, *Horner* 396, 397; Pullman, *Piper*, May, 1894; Almota, *Piper* 1809; Horseshoe Basin, *Lake & Hull* 780; Clarkston, *Hunter* 41; Wawawai, *Elmer* 776; without locality, *Cooper*; Stuart Island, *Lawrence* 101.

Zonal distribution: Transition.

2. **Thalesia fasiculata** (Nutt.) Britton, Mem. Torr. Club **5**: 298. 1894.

Orobanche fasciculata Nutt. Gen. **2**: 59. 1818.
Aphyllon fasciculata Torr. & Gr. in Gray, Man. ed. 2. 281. 1856.

Type locality: "In sandy alluvial soil about Fort Mandan," North Dakota.

Range: British Columbia to California, Nebraska, Indiana, and Saskatchewan.

Specimens examined: Olympic Mountains, *Flett* 101; *Elmer* 2556; *J. M. Grant* in 1889; Whidby Island, *Gardner* 241; near Clealum, *Henderson*, June, 1892; west Klickitat County, *Suksdorf* 2098, 2102; Wenache, *Whited*, May 25, 1895; Wenache Mountains, *Whited* 1238; Pasco, *Hindshaw* 37; junction Crab and Wilson creeks, *Sandberg & Leiberg* 298; Coulee City, *Piper* 3873; Blue Mountains, *Horner* 399, 398; Wawawai, *Piper*, May 26, 1894; Illia, *Lake & Hull* 779; Big Meadow, *Kreager* 415; Spokane, *Dewart* in 1901; Rattlesnake Mountains, *Cotton* 679.

Zonal distribution: Transition.

OROBANCHE.

Flowers pedicellate.
  Stems low, stout; anthers woolly .... 1. *O. comosa.*
  Stems taller; anthers glabrous or hairy .... 2. *O. californica.*
Flowers subsessile; anthers glabrous or nearly so.
  Stems tuber-like at base, branched above .... 3. *O. pinorum.*
  Stems not tuber-like at base, usually simple .... 4. *O. ludoviciana.*

1. **Orobanche comosa** Hook. Fl. Bor. Am. **2**: 92. 1838.

Aphyllon comosum A. Gray, Bot. Cal. **1**: 584. 1876.

Phelipoea comosa A. Gray, Pac. R. Rep. **12**^{2}: 54. 1860.

TYPE LOCALITY: "Banks of the Columbia." Collected by Douglas, by Scouler, and by Gairdner.

RANGE: Washington to California.

SPECIMENS EXAMINED: Whidby Island, *Gardner* 358; Falcon Valley, *Suksdorf* 82; without locality, *Brandegee* 1029; Rock Island, *Sandberg & Leiberg* 456; Chelan, *Elmer* 506; Grand Coulee, *Lake & Hull* 778; Soap Lake, *McKay* 3; Squaw Creek, *Cotton* 876; Rattlesnake Mountains, *Cotton* 764; Flat Top Island, *Lawrence* 103; Sucia Island, *Flett* 2755.

ZONAL DISTRIBUTION: Upper Sonoran and Transition.

2. **Orobanche californica** Cham. & Schlecht. Linnaea **3**: 134. 1828.

Aphyllon californica A. Gray, Bot. Cal. **1**: 584. 1876.

TYPE LOCALITY: "E vicinia portus St. Francisco," California.

RANGE: Washington to California and Nevada.

SPECIMENS EXAMINED: Walla Walla region, *Brandegee* 1030.

3. **Orobanche pinorum** Geyer; Hook. Kew. Journ. Bot. **3**: 297. 1851.

Aphyllon pinetorum A. Gray, Bot. Cal. **1**: 585. 1876.

TYPE LOCALITY: "Top of high mountains near St. Joseph, Coeur d'Aleine country. Growing on the roots of *Abies balsamea*," Idaho. Collected by Geyer.

RANGE: Eastern Washington and Idaho.

SPECIMENS EXAMINED: Columbia Valley, latitude 46° to 49°, *Lyall*, June, 1860; Ione, *Kreager* 403.

ZONAL DISTRIBUTION: Arid Transition.

4. **Orobanche ludoviciana** Nutt. Gen. **2**: 58. 1818.

Aphyllon ludovicianum A. Gray, Bot. Cal. **1**: 585. 1876.

TYPE LOCALITY: "In sandy alluvial soils around Fort Mandan," North Dakota.

RANGE: Washington to Saskatchewan, Texas, and California.

SPECIMENS EXAMINED: Rock Island, *Sandberg & Leiberg* 436; west Klickitat County, *Suksdorf* 2248; Wawawai, *Piper* 2842; Lake Chelan, *Gorman* 720; Craigs Ferry, *Cotton* 1343; Granddalles, *Westgate* in 1905; "on roots of *Psoralea verrucosa* in the light drift sand desert at the mouth of Lewis and Walla Walla rivers," *Geyer*.

ZONAL DISTRIBUTION: Upper Sonoran.

BOSCHNIAKIA.

1. **Boschniakia strobilacea** A. Gray, Pac. R. Rep. **4**: 118. 1856.

TYPE LOCALITY: "Dry and rocky hills South Yuba," California.

RANGE: Washington to California in the coast region.

SPECIMENS EXAMINED: Cape Foulweather, *Howell*; near Union City, *Piper* in 1890; Bitter Lake, near Seattle, *Piper* 1127; Springfield, *Robbins*, May 10, 1897.

The common host plants are *Gaultheria shallon* and *Arctostaphylos tomentosa*.

ZONAL DISTRIBUTION: Humid Transition.

PINGUICULACEAE.

Aquatic plants; leaves dissected .... UTRICULARIA.
Terrestrial plants; leaves entire .... PINGUICULA.

UTRICULARIA. BLADDERWORT.

Leaves 2 to 3-pinnately divided, very bladdery; flowers large .... 1. *U. vulgaris.*
Leaves repeatedly dichotomous; flowers small.
  Bladders mostly on leafless branches .... 2. *U. intermedia.*
  Bladders among the leaves.
    Spur of corolla short and obtuse .... 3. *U. minor.*
    Spur of corolla conical, acute .... 4. *U. occidentalis.*

1. **Utricularia vulgaris** L. Sp. Pl. **1**: 18. 1753.
TYPE LOCALITY: European.
RANGE: British Columbia to California, Texas, and Newfoundland.
SPECIMENS EXAMINED: Mud Lake, near Seattle, *Piper* 1103; Whidby Island, *Gardner* 368; Olympia, *Kincaid*, June, 1896; Falcon Valley, *Suksdorf* 468.
ZONAL DISTRIBUTION: Humid Transition.

2. **Utricularia intermedia** Hayne, Schrad. Journ. Bot. **1**: 18. 1800.
TYPE LOCALITY: "Habitat in inundatis prope Berolinum et Upsaliam."
RANGE: Subarctic regions, southward to California, Ohio, and New Jersey. Europe. Asia.
SPECIMENS EXAMINED: Falcon Valley, *Suksdorf* 168.

3. **Utricularia minor** L. Sp. Pl. **1**: 18. 1753.
TYPE LOCALITY: European.
RANGE: British Columbia to Canada, southward to California, Utah, and New Jersey. Europe. Asia.
SPECIMENS EXAMINED: Mud Lake, near Seattle, *Piper* in 1891; Olympia, *Kincaid* in 1896; Skamania County, *Suksdorf* 2239.
ZONAL DISTRIBUTION: Humid Transition.

4. **Utricularia occidentalis** A. Gray, Proc. Am. Acad. **19**: 95. 1884.
TYPE LOCALITY: "Washington Territory in Falcon Valley." Collected by Suksdorf.
RANGE: Known only from the type locality.
SPECIMENS EXAMINED: Falcon Valley, *Suksdorf* 169 (type), 469; *Henderson.*

2. PINGUICULA.

1. **Pinguicula vulgaris** L. Sp. Pl. **1**: 17. 1753.
TYPE LOCALITY: European.
RANGE: Oregon to the Adirondacks and northward.
SPECIMENS EXAMINED: Olympic Mountains, *Piper*, August, 1895; *Elmer* 2526; Mount Rainier, *Piper* 2067; *Flett* 237; Silverton, *Bouck* 177a; Mount Stuart, *Elmer* 1212; *Brandegee* 1031; Skagit Pass, *Lake & Hull* 582; Stevens Pass, *Sandberg & Leiberg* 793; Loomis, *Elmer*, September, 1897.
ZONAL DISTRIBUTION: Hudsonian and Arctic.

PLANTAGINACEAE. PLANTAIN FAMILY.

PLANTAGO. PLANTAIN.

Leaves ovate or lanceolate.
  Seeds numerous; leaves ovate .... 1. *P. major.*
  Seeds only 2 to 4; leaves lanceolate .... 2. *P. lanceolata.*

- Leaves linear.
  - Corolla lobes spreading in fruit.
    - Leaves fleshy; seaside plant.................................... 3. *P. maritima.*
    - Leaves not fleshy.
      - Spikes woolly; bracts short................................ 4. *P. purshii.*
      - Spikes not woolly; bracts long............................. 5. *P. aristata.*
  - Corolla lobes closed over the fruit.
    - Spikes short, dense; capsules 3 to 4 mm. long.................. 6. *P. bigelovii.*
    - Spikes slender; capsules 2 mm. long............................ 7. *P. elongata.*

1. **Plantago major** L. Sp. Pl. **1**: 113. 1753.

Type locality: European.

Range: Nearly cosmopolitan.

Specimens examined: Silverton, *Bouck* in 1899; Seattle, *Piper*, July 1, 1895; Tacoma, *Flett* 223; Ellensburg, *Whited* 548; North Yakima, *Watt*, August, 1895.

One form of this plant found on gravelly lake shores and in salt marshes seems to be native.

2. **Plantago lanceolata** L. Sp. Pl. **1**: 113. 1753.

Type locality: European.

Specimens examined: Silverton, *Bouck;* Pullman, *Piper*, July 20, 1894.

A common weed in lawns and pastures.

3. **Plantago maritima** L. Sp. Pl. **1**: 114. 1753.

Type locality: "Habitat in littoribus marimis Europae borealis."

Range: Seacoasts, Labrador to New Jersey and Alaska to California. Europe. Asia.

Specimens examined: Whidby Island, *Gardner* 252; Orchard Point, *Piper*, July, 1895; Tacoma, *Flett* 118; Clallam County, *Elmer* 2817.

Zonal distribution: Humid Transition.

4. **Plantago purshii** Roem. & Schult. Syst. **3**: 120. 1818.

Plantago lagopus L. err. det. Pursh, Fl. **1**: 99. 1814.

Plantago gnaphalioides Nutt. Gen. **1**: 100. 1818.

Plantago patagonica gnaphalioides A. Gray, Syn. Fl. **2^1**: 391. 1878.

Type locality: "In dry situations on the banks of the Missouri."

Range: British Columbia to Ontario and Mexico.

Specimens examined: Olympia, *Kincaid*, July 4, 1896; Wenache, *Whited* 169, 1097; Rattlesnake Mountains, *Cotton* 392; Cascade Mountains to Colville, *Lyall* in 1860; Pasco, *Hindshaw* 1; *Henderson*, June 12, 1892; Crab and Wilson creeks, *Sandberg & Leiberg* 278; without locality, *Vasey* in 1889; Clarks Springs, *Kreager* 141, 16; Chelan, *Elmer* 505; Lake Chelan, *Lake & Hull*, August 13, 1892; Spokane, *Piper*, July, 1896; Wawawai, *Lake & Hull* 655; *Piper*, June 9, 1894; Okanogan, *Griffiths & Cotton* 285; Cow Creek, *Griffiths & Cotton* 546; Brewster, *Griffiths & Cotton* 256; Wenache, *Griffiths & Cotton* 145.

Zonal distribution: Arid Transition and Upper Sonoran.

5. **Plantago aristata** Michx. Fl. **1**: 95. 1803.

Plantago patagonica aristata A. Gray, Man. ed. 2. 269. 1856.

Type locality: "In pratensibus Illinoensium."

Range: British Columbia to Dakota, New Mexico, and Texas. Spreading as a weed eastward.

Specimens examined: Seattle, *Gardner* 376.

6. **Plantago bigelovii** A. Gray, Pac. R. Rep. **4**: 117. 1856.

Type locality: Benicia, California.

Range: British Columbia to California along the coast.

Specimens examined: Whidby Island, *Gardner* 424; Seattle, *Piper & Smith* 1088.

Zonal distribution: Humid Transition.

7. Plantago elongata Pursh, Fl. **2**: 729. 1814.
Plantago pusilla Nutt. Gen. **1**: 100. 1818.
TYPE LOCALITY: "In Upper Louisiana."
RANGE: Washington to New England and Texas.
SPECIMENS EXAMINED: White Salmon, *Suksdorf* 306; Major Creek, *Suksdorf,* May 4, 1886.

RUBIACEAE. MADDER FAMILY.

Leaves whorled, without stipules .... GALIUM (p. 525).
Leaves opposite, stipulate .... KELLOGGIA (p. 527).

GALIUM.

- Annuals; fruit hispid or hirsute.
  - Leaves mostly in 4's; stems erect, smooth .... 3. *G. bifolium.*
  - Leaves 6 to 8 in each whorl; stems rough on the angles.
    - Stems erect or ascending; fruit 2 to 3 mm. broad .... 1. *G. vaillantii.*
    - Stems reclining; fruit 4 to 6 mm. broad .... 2. *G. aparine.*
- Perennials.
  - Stems wholly herbaceous.
    - Leaves 3-nerved in whorls of four.
      - Fruit hispid.
        - Leaves oblong-ovate, acutish .... 4a. *G. kamtschaticum oreganum.*
        - Leaves obovate or orbicular, obtuse .... 4. *G. kamtschaticum.*
      - Fruit canescent, becoming smooth; leaves linear .... 5. *G. boreale.*
    - Leaves 1-nerved.
      - Whorls containing four, five, or six leaves; fruit smooth.
        - Flowers in clusters of three, or solitary-axillary .... 6. *G. trifidum.*
        - Flowers cymose, numerous .... 7. *G. cymosum.*
      - Whorls containing six leaves; fruit not smooth.
        - Fruit granulate-scabrous .... 8. *G. asperrimum.*
        - Fruit hispid with hooked hairs .... 9. *G. triflorum.*
  - Stems suffrutescent.
    - Herbage glabrous.
      - Leaves ovate, thick .... 10. *G. multiflorum.*
      - Leaves oblong, thin .... 10a. *G. multiflorum watsoni.*
    - Herbage puberulent; leaves ovate .... 10b. *G. multiflorum puberulum.*

1. Galium vaillantii DC. Fl. Fr. **4**: 263. 1805.
Galium aparine minor [*us*] Hook. Fl. Bor. Am. **1**: 290. 1833.
Galium aparine vaillantii Koch, Fl. Germ. 330. 1837.
TYPE LOCALITY: Near Paris, France.
RANGE: British Columbia to California and Texas.
SPECIMENS EXAMINED: West Klickitat County, *Suksdorf* 1659 (?); between Coulee City and Waterville, *Spillman,* May, 1896; Coulee City, *Piper* 3858; Kamiak Butte, *Piper* 3858.

2. Galium aparine L. Sp. Pl. **1**: 108. 1753.
TYPE LOCALITY: European.
RANGE: Alaska to Canada, southward to California and Texas. Europe. Asia.
SPECIMENS EXAMINED: Montesano, *Heller* 4007; Lopez Island, *Lyall* in 1858; Peshastin,

Sandberg & Leiberg 505; west Klickitat County, *Suksdorf* 1659; Skokomish River, *Henderson*, May 12, 1892; Pullman, *Piper*.

ZONAL DISTRIBUTION: Transition.

3. Galium bifolium S. Wats. Bot. King Explor. 134. 1871.

TYPE LOCALITY: "In the Trinity, Battle, and East Humboldt Mountains, Nevada, and in the Wahsatch."

RANGE: Washington to California, Colorado, and Montana.

SPECIMENS EXAMINED: Mount Adams, *Suksdorf* 328; Mount Stuart, *Elmer* 1101; Klickitat River, *Flett* 1194; Blue Mountains, *Piper* 2406.

ZONAL DISTRIBUTION: Canadian?

4. Galium kamtschaticum Steller; Roem. & Schult. Mant. **3**: 186. 1827.

TYPE LOCALITY: Kamtschatka.

RANGE: Alaska to New England and Washington. Siberia.

SPECIMENS EXAMINED: Stevens Pass, *Sandberg & Leiberg* 754.

4a. Galium kamtschaticum oreganum (Britton).

Galium oreganum Britton, Bull. Torr. Club **21**: 31. 1894.

TYPE LOCALITY: Oregon. Collected by Howell.

RANGE: Washington and Oregon in the coast region.

SPECIMENS EXAMINED: Clallam County, *Elmer* 2547; Lake Cushman, *Piper* 921; Mount Adams, *Flett* 1192; Goat Mountains, *Allen* 296; Cascade Mountains, *Suksdorf* 22; Skamania County, *Suksdorf* 864; Skokomish Valley, *Kincaid*, May, 1892; Stampede Pass, *Henderson*, July 26, 1892.

ZONAL DISTRIBUTION: Canadian.

5. Galium boreale L. Sp. Pl. **1**: 108. 1753.

Galium boreale linearifolium Rydberg, Mem. N. Y. Bot. Gard. **1**: 375. 1900.

TYPE LOCALITY: "Habitat in Europae borealis pratis."

RANGE: Alaska to Canada, southward to California, Texas, and Pennsylvania. Europe. Asia.

SPECIMENS EXAMINED: Montesano, *Heller* 4020; San Juan Island, *Lyall* in 1858; Cascade Mountains, latitude 49°, *Lyall* in 1859; Muckleshoot Prairie, *Dr. Ruhn*; Snoqualmie, *Smith* 605; Beaver Creek, *Whited* 18, 228; Ellensburg, *Whited* 437; North Yakima and Spokane, *Henderson*, May 27, July 9, 1892; Pullman, *Hull* 556; *Piper* 1504; without locality *Vasey* in 1899.

In some of the older botanical works our plant is erroneously referred to the European *G. rubioides* L.

ZONAL DISTRIBUTION: Transition and Upper Sonoran.

6. Galium trifidum subbiflorum Wiegand, Bull. Torr. Club **24**: 399. 1897.

TYPE LOCALITY: Colorado.

RANGE: Washington to Alberta, south to Arizona and California.

SPECIMENS EXAMINED: Westport, *Lamb* 1107; Cascade Mountains, latitude 49°, *Lyall* in 1858; Ellensburg, *Whited* 480; Nason Creek, *Sandberg & Leiberg* 606; Pullman, *Piper*, July 25, 1895; Lake Kalispel, *Kreager* 444.

ZONAL DISTRIBUTION: Transition and Canadian.

This subspecies has the flowers often 2 to each pedicel, and leaves 8 to 10 mm. long.

The northwestern plants referred by Hooker[a] to *G. claytoni* Michx. and *G. tinctorium* L. undoubtedly belong to *G. trifidum*.

6a. Galium trifidum pacificum Wiegand, Bull. Torr. Club **24**: 400. 1897.

TYPE LOCALITY: Placer County, California.

RANGE: Washington to California.

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[a] Fl. Bor. Am. **2**: 288. 1840.

SPECIMENS EXAMINED: Hoquiam, *Lamb* 1220; Clallam County, *Elmer* 2547; Seattle, *Piper;* west Klickitat County, *Suksdorf* 1661.

This subspecies has solitary flowers and leaves 15 to 25 mm. long.

7. **Galium cymosum** Wiegand, Bull. Torr. Club **24**: 401. 1897.

TYPE LOCALITY: Tacoma, Washington. Collected by Flett.

RANGE: British Columbia to Oregon near the coast.

SPECIMENS EXAMINED: Montesano, *Heller* 4009; Tacoma, *Flett* 165, 37; Stuart Island, *Lawrence* 87; Port Crescent, *Lawrence* 290.

ZONAL DISTRIBUTION: Humid Transition.

8. **Galium asperrimum** A. Gray, Mem. Am. Acad. **4**: 60. 1849.

TYPE LOCALITY: "Wet places, near irrigating ditches, Sante Fe," New Mexico.

RANGE: Washington to California and New Mexico.

SPECIMENS EXAMINED: Ellensburg, *Whited* 584; Spangle, *Suksdorf* 923; along Tukanon River, *Lake & Hull*, July 2, 1892; Blue Mountains, *Piper*, July, 1896; Meyers Falls, *Kreager*, August 20, 1902, and 508; Pullman, *Piper* 1804, 1717; *Henderson* 2487; *Elmer*.

ZONAL DISTRIBUTION: Arid Transition.

9. **Galium triflorum** Michx. Fl. **1**: 80. 1803.

TYPE LOCALITY: Canada.

RANGE: Alaska to Canada, southward to California, Colorado, and Alabama.

SPECIMENS EXAMINED: Clallam County, *Elmer* 2458; Cascade Mountains, latitude 49°, *Lyall*, in 1859; Silverton, *Bouck* 98; Skokomish Valley, *Kincaid*, June 7, 1892; Skagit Pass, *Lake & Hull* 791; Ellensburg, *Whited*, June 22, 1897; Nason Creek, *Sandberg & Leiberg* 651; Blue Mountains, *Horner* 368; without locality, *Vasey* in 1889; Clarks Springs, *Kreager* 34; Mount Rainier, *Flett* 2150.

ZONAL DISTRIBUTION: Transition.

10. **Galium multiflorum** Kellogg, Proc. Cal. Acad. **2**: 97. 1863.

TYPE LOCALITY: Washoe, Nevada.

RANGE: Washington to California and Utah.

SPECIMENS EXAMINED: Blue Mountains, *Horner*, August 1, 1896; without locality, *Brandegee* 814.

10a. **Galium multiflorum watsoni** A. Gray, Syn. Fl. **1**^{2}: 40. 1884.

TYPE LOCALITY: "Cañons and gulches, N. Arizona to E. Oregon and adjacent Idaho."

RANGE: Washington and Idaho to Arizona.

SPECIMENS EXAMINED: Blue Mountains, *Horner* 372, 373.

10b. **Galium multiflorum puberulum** subsp. nov.

Whole herbage densely and finely hirtellous; leaves oblong to elliptical or the upper ones ovate.

SPECIMENS EXAMINED: Cleman Mountain, *Henderson*, June 14, 1892; Wenache *Whited* 88, 1108; Ellensburg, *Elmer* 414 (type); without locality, *Brandegee* 813; without locality, *Vasey* in 1889; junction Cool and Crab creeks, *Sandberg & Leiberg* 224; Rattlesnake Mountains, *Cotton* 696.

KELLOGGIA.

1. **Kelloggia galioides** Torr. Bot. Wilkes. Exped. 332. 1874.

TYPE LOCALITY: Walla Walla River, Washington.

RANGE: Washington to Wyoming, Arizona, and California.

SPECIMENS EXAMINED: Mount Adams, *Gorman*, August 7, 1897; west Klickitat County, *Suksdorf*; Klickitat River, *Flett* 1021; Peshastin, *Sandberg & Leiberg* 479; Wenache region, *Brandegee* 816; Roslyn, *Whited* 473; Clealum, *Henderson* in 1892.

ZONAL DISTRIBUTION: Canadian.

CAPRIFOLIACEAE. Honeysuckle Family.

Corolla tubular or campanulate; styles elongate.
Creeping vine; flowers in pairs; fruit dry .... LINNAEA (p. 528).
Shrubs, erect or climbing; fruit a berry.
Corolla short, campanulate, regular .... SYMPHORICARPOS (p. 528).
Corolla tubular, irregular .... LONICERA (p. 529).
Corolla rotate or open campanulate, in compound cymes.
Leaves pinnate .... SAMBUCUS (p. 530).
Leaves simple .... VIBURNUM (p. 531).

LINNAEA.

1. **Linnaea americana** Forbes, Hort. Woburn. 135. 1833.

Linnaea borealis longiflora Torr. Bot. Wilkes Exped. 327. 1874.

Linnaea longiflora Howell, Fl. N. W. Am. 280. 1900.

Type locality: "America."

Range: Alaska to Newfoundland, south to Oregon, Colorado, and Maryland.

Specimens examined: Clallam County, *Elmer* 2739; Cascade Mountains, latitude 49°, *Lyall* in 1859; Fidalgo Island, *Lyall* in 1858; Silverton, *Bouck* 93; upper Nisqually Valley, *Allen* 19; Blue Mountains, *Lake & Hull* 547; without locality, *Vasey* in 1889; Mount Carlton, *Kreager* 181.

Zonal distribution: Humid Transition and Canadian.

SYMPHORICARPOS. Waxberry.

Corolla campanulate, 2 to 4 mm. long.
Erect shrub; leaves glabrous .... 1. *S. racemosus.*
Trailing shrub; leaves pubescent .... 2. *S. mollis.*
Corolla cylindric-campanulate, 6 to 7 mm. long .... 3. *S. acutus.*

1. **Symphoricarpos racemosus** Michx. Fl. 1: 107. 180

Type locality: "Ad lacus Mistassins," Canada.

Range: British Columbia to Canada, southward to California and Pennsylvania.

Specimens examined: Montesano, *Heller* 3948; Clallam County, *Elmer* 2738; Cascade Mountains, latitude 49°, *Lyall*; Silverton, *Bouck* 121a; Orchard Point, *Piper*, July 15, 1895; Tacoma, *Flett* 152; Woodlawn, *Henderson*, June 6, 1892; Falcon Valley, *Suksdorf*; Lower Cascades, *Suksdorf*; Peshastin, *Sandberg & Leiberg* 804; Ellensburg, *Whited* 456; Sprague, *Henderson*, May 30, 1892; Pullman, *Hull* 542; *Piper* 1892, 1690; *Elmer* 836; Tukanon River, *Lake & Hull*, July 2, 1892; Blue Mountains, *Piper* 2418; without locality, *Vasey* in 1889; Clarks Springs, *Kreager* 563, 36; Rattlesnake Mountains, *Cotton* 694.

Zonal distribution: Transition.

This species varies considerably, especially in the pubescence and the thickness of the leaves. Woodland forms tend to be thinner-leaved than the prairie form, and are usually more pubescent beneath. All gradations seem to occur between plants with leaves perfectly glabrous beneath and those which are quite pubescent. According to Fernald,[a] the latter is the typical *S. racemosa* Michx., while the perfectly smooth form he considers a subspecies, *S. racemosa laevigata* Fernald.

2. **Symphoricarpos mollis** Nutt.; Torr. & Gr. Fl. 2: 4. 1841.

Type locality. "St. Barbara, California."

Range: Washington to California.

Specimens examined: Upper Nisqually Valley, *Allen* 105; Olympia, *Kincaid*, July 4, 1896; Mount Adams, *Henderson*, August 12, 1892; McAllisters, *Henderson*, June 22, 1892; Blue Mountains, *Piper* 2412; without locality, *Cooper*; without locality, *Vasey* in 1889.

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[a] Rhodora 7: 167. 1905.

ZONAL DISTRIBUTION: Transition.

The northwestern specimens that have been referred to *S. pauciflorus* (Robbins) Howell belong apparently to *S. mollis*.

3. **Symphoricarpos acutus** (A. Gray) Howell, Fl. N. W. Am. 281. 1900.
Symphoricarpos mollis acutus A. Gray, Syn. Fl. 1²: 14. 1878.
Symphoricarpos vaccinoides Rydberg, Mem. N. Y. Bot. Gard. 1: 371. 1900.

TYPE LOCALITY: "Washington Terr., east of the Cascade Mountains." Collected by Pickering and Breckenridge.

RANGE: Washington and Oregon to Montana.

SPECIMENS EXAMINED: Without locality, *Pickering & Breckenridge;* Mount Adams, *Suksdorf* 188; Egbert Springs, *Sandberg & Leiberg* 367; Simcoe Mountains, *Howell* 328; Wenache Mountains, *Whited* 1282; Nile River, *Henderson* 2565; Blue Mountains, *Piper* 2394; without locality, *Vasey* in 1889.

ZONAL DISTRIBUTION: Arid Transition and Canadian?

The type of *S. acutus* has unusually narrow leaves, but it seems not distinguishable from *S. vaccinoides*. This species is near *S. rotundifolius* A. Gray, to which specimens have commonly been referred.

SYMPHORICARPOS OCCIDENTALIS[a] is said in the original description to have been collected at "Fort Vancouver" by Douglas; Cooper also lists this species as "common."

With little doubt these references belong to *S. racemosus*, as no trace of *S. occidentalis* has been found by recent collectors in Washington.

LONICERA. HONEYSUCKLE.

Climbing shrubs; flowers in terminal clusters; upper leaves connate-perfoliate.
  Flowers orange; stamens and style little exserted................ 1. *L. ciliosa*.
  Flowers pink; stamens and style long-exserted.................. 2. *L. hispidula*.
Erect shrubs; flowers on axillary peduncles in pairs; upper leaves not connate.
  Bracts large, foliaceous; flowers yellow; fruit black.............. 3. *L. involucrata*.
  Bracts small and narrow.
    Leaves somewhat pale beneath; berries blue-black........... 6. *L. coerulea*.
    Leaves green on both sides; berries red.
      Corolla dark-purple, 2-lipped............................ 4. *L. conjugialis*.
      Corolla whitish, its lobes subequal...................... 5. *L. utahensis*.

1. **Lonicera ciliosa** (Pursh) Poir. Encyc. Suppl. **5**: 612. 1817.
Caprifolium ciliosum Pursh, Fl. **1**: 160. 1814.
Lonicera occidentalis Lindl. Bot. Reg. **17**: *pl. 1457*. 1831.

TYPE LOCALITY: "On the banks of the Kooskoosky," Idaho. Collected by Lewis, near the present town of Kamiah.

RANGE: British Columbia to Montana, southward to California and Arizona.

SPECIMENS EXAMINED: Montesano, *Heller* 3938; upper Valley Nisqually, *Allen* 113; Seattle, *Piper*, June, 1892; Klickitat County, *Suksdorf;* Klickitat River, *Flett* 1264; Peshastin, *Sandberg & Leiberg* 554; Cascade Mountains, *Lyall* in 1859; lower Cascades, *Suksdorf;* Skokomish Valley, *Kincaid*, June 15, 1892; Clealum, *Henderson*, June 11, 1892; without locality, *Vasey* in 1889; Mount Carlton, *Kreager* 200; Stehekin, *Griffiths & Cotton* 217.

ZONAL DISTRIBUTION: Transition.

The color of the flowers of this species varies from pale orange to nearly scarlet.

2. **Lonicera hispidula** Dougl.; Lindl. Bot. Reg. **21**: *pl. 1761*. 1836.
Caprifolium hispidulum Lindl. l. c.

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[a] Hook. Fl. Bor. Am. 1: 285. 1840.

Lonicera? microphylla Hook. Fl. Bor. Am. **1**: 283. 1833, not Willd. 1819.

TYPE LOCALITY: "In the woods of North West America." Collected by Douglas.

RANGE: British Columbia to Oregon in the coast region.

SPECIMENS EXAMINED: Puget Sound, *Henderson* in 1892; Seattle, *Piper* in 1885; Orchard Point, *Piper*, July, 1895; Tacoma, *Flett* 128.

ZONAL DISTRIBUTION: Humid Transition.

3. **Lonicera involucrata** Banks; Richards. Bot. App. Frankl. Journ. 733. 1823.

Lonicera ledebouri Esch. Mem. Acad. Petersb. **10**: 284. 1826.

Xylosteum involucratum Richards. Bot. App. Frankl. Journ. 733. 1823.

TYPE LOCALITY: "Wooded country from 54° to 64° north," British America.

RANGE: Alaska to Canada southward to California, Colorado, and Lake Superior.

SPECIMENS EXAMINED: Cascade Mountains, *Mrs. Steinweg* in 1894; mountains north of Ellensburg, *Whited*, August 28, 1898; *Piper*, May 20, 1897; near Skagit Pass, *Lake & Hull* 543; Wenache Mountains, *Elmer* 436; upper Nisqually Valley, *Allen* 215; Entiat Creek, *Mrs. Howe;* Nason Creek, *Sandberg & Leiberg* 610; Blue Mountains, *Piper*, July, 1896; without locality, *Vasey* in 1889; Mount Carlton, *Kreager* 256; Hoquiam, *Lamb* 1014; Admiralty Head, *Piper*, May, 1898; Tacoma, *Flett* 60; McAllisters Lake, *Henderson*, June 22, 1892; Ilwaco, *Piper* 4956; Stehekin, *Griffiths & Cotton* 197; Clealum Creek, *Cotton* 829.

ZONAL DISTRIBUTION: Transition.

4. **Lonicera conjugialis** Kellogg, Proc. Cal. Acad. **2**: 67. 1863.

Xylosteum conjugialis Howell, Fl. N. W. Am. 282. 1902.

TYPE LOCALITY: "Washoe," Nevada. Collected by Dr. J. A. Veatch.

RANGE: Washington and Idaho to Nevada and California.

SPECIMENS EXAMINED: Mount Adams, *Suksdorf* 389; Simcoe Mountains, *Howell* 296; Big Klickitat River, *Henderson* August 4, 1892.

ZONAL DISTRIBUTION: Canadian.

5. **Lonicera utahensis** S. Wats. Bot. King Explor. 133. 1871.

Lonicera ebractulata Rydberg, Mem. N. Y. Bot. Gard. **1**: 372. 1900.

Xylosteum utahense Howell, Fl. N. W. Am. 282. 1900.

TYPE LOCALITY: "Wasatch Mountains, Utah, in Cottonwood Canon; 9,000 feet altitude."

RANGE: British Columbia to Montana and Utah.

SPECIMENS EXAMINED: Olympic Mountains, *Flett* 99; *Elmer* 2736; Blue Mountains, *Horner* 319, *Piper*, July, 1896; Mount Carlton, *Kreager* 283.

ZONAL DISTRIBUTION: Canadian and Hudsonian.

6. **Lonicera coerulea** L. Sp. Pl. **1**: 174. 1753.

Xylosteum villosum Michx. Fl. **1**: 106. 1803.

TYPE LOCALITY: "In Helvetia."

RANGE: Alaska to Labrador, south to California, Wisconsin, and New England.

SPECIMENS EXAMINED: Mount Adams, *Suksdorf* 559.

SAMBUCUS. ELDER.

Inflorescence flat-topped; berries black with a bloom................ 1. *S. glauca.*
Inflorescence pyramidal.
  Berries red, rarely yellow or chestnut............................ 2. *S. callicarpa.*
  Berries black.. 3. *S. melanocarpa.*

1. **Sambucus glauca** Nutt.; Torr. & Gr. Fl. **2**: 13. 1841.

TYPE LOCALITY: "Plains of the Oregon, near the Blue Mountains." Collected by Nuttall.

RANGE: Washington and Idaho to California and Nevada.

SPECIMENS EXAMINED: Clallam County, *Elmer* 2740; Seattle, *Piper;* Nisqually Valley, *Allen* 302; Wenache, *Whited* 1248; Ellensburg, *Whited,* June 6, 1897; Olympia, *Heller* 4050; Egbert Springs, *Sandberg & Leiberg* 363; Lake Chelan, *Lake & Hull* 546; Blue Mountains, *Piper,* August 2, 1896; Pullman, *Piper* 1726; without locality, *Brandegee* 809; without locality, *Vasey* 289; Clarks Springs, *Kreager* 73, 560; Rattlesnake Mountains, *Cotton* 757; Stehekin, *Griffiths & Cotton* 224.

ZONAL DISTRIBUTION: Transition, especially Arid.

The name *Sambucus coerulea* Raf. Alsographia Am. 48. 1838, undoubtedly pertains to our plant, but it may be questioned if it is really published. Rafinesque bases the name wholly upon a brief mention in the journals of Lewis and Clark of an elder with blue berries.

2. **Sambucus callicarpa** Greene, Fl. Fran. 342. 1892.

Sambucus racemosa arborescens (Nutt.) Torr. & Gr. Fl. N. Am. **2**: 13. 1841, not *S. arborescens* Gilib. **1**: 5. 1792.

Sambucus leiosperma Leiberg, Proc. Biol. Soc. Wash. **11**: 40. 1897.

Sambucus pubens Michx. var. Cooper Pac. R. Rep. **12**^{2}: 64. 1860.

Sambucus arborescens Howell, Fl. N. W. Am. 279. 1900.

TYPE LOCALITY: "By streams * * * along the Coast Range," California.

RANGE: British Columbia to California in the coast region.

SPECIMENS EXAMINED: Clallam County, *Elmer* 2737; Skokomish River, *Kincaid* in 1890; Seattle, *Piper* in 1887; Montesano, *Heller* 3922; Cape Disappointment, *Engelmann & Sargent,* July 13, 1880; Silverton, *Bouck* 95; Bridge Creek, *Elmer* 662; Cascade Mountains to Fort Colville, latitude 49°, *Lyall* in 1860; Stevens Pass, *Whited* 1435; without locality *Vasey* in 1889; Nason Creek, *Sandberg & Leiberg* 670; Skagit Pass, *Lake & Hull* 545; Wenache region, *Brandegee* 808 (the last two specimens have the nutlets somewhat rugose).

ZONAL DISTRIBUTION: Humid Transition.

The fruit is usually brilliant scarlet, but occasionally yellow. Along the bluff between Seattle and Everett the great majority of the plants have the fruit chestnut-colored, but the plants are otherwise identical with the ordinary scarlet-fruited form.

3. **Sambucus melanocarpa** A. Gray, Proc. Am. Acad. **19**: 76. 1883.

TYPE LOCALITY: "First collected in New Mexico by Fendler."

RANGE: Washington and Montana to California and New Mexico.

SPECIMENS EXAMINED: Mount Adams, *Suksdorf* 1664, 327; Blue Mountains, *Piper* 2452. Mount Carlton, *Kreager* 246.

ZONAL DISTRIBUTION: Canadian.

5. VIBURNUM.

Cyme radiant, that is the outer flowers neutral and enlarged.......... 1. *V. opulus.*
Cyme not radiant.
    Leaves roundish, mostly 3-lobed.................................. 2. *V. pauciflorum.*
    Leaves oval to elliptic, dentate................................. 3. *V. ellipticum.*

1. **Viburnum opulus** L. Sp. Pl. **1**: 268. 1753.

Viburnum opulus americanum Ait. Hort. Kew. **1**: 373. 1789.

TYPE LOCALITY: European.

RANGE: British Columbia to New Brunswick, south to Oregon and Pennsylvania.

SPECIMENS EXAMINED: Cape Horn, *Piper* 4976. Reported by Lyall[a] as occurring on Sumas River, latitude 49°.

ZONAL DISTRIBUTION: Humid Transition.

2. **Viburnum pauciflorum** Pylaie; Torr. & Gr. Fl. **2**: 17. 1841. HIGH BUSH CRANBERRY.

Viburnum acerifolium L. err. det. Bong. Mem. Acad. St. Peterb. VI. **2**: 144. 1832.

TYPE LOCALITY: Newfoundland.

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[a] Journ. Linn. Soc. **7**: 135. 1864.

RANGE: Alaska to Labrador, southward to Washington, Colorado, Saskatchewan, and New England.

SPECIMENS EXAMINED: Cascade Mountains, latitude 49°, *Lyall* in 1859; Silverton, *Bouck* 94; Mount Adams, *Suksdorf* 388; Goose Lake, *Flett* 1315; Stevens Pass, *Sandberg & Leiberg* 722; Simcoe Mountains, *Howell;* Lake Chelan, *Lake & Hull* 548; without locality, *Vasey* in 1889.

ZONAL DISTRIBUTION: Canadian and Hudsonian.

3. **Viburnum ellipticum** Hook. Fl. Bor. Am. 1: 280. 1833.

Viburnum ellipticum macrocarpum Suksdorf, Deutsch. Bot. Monatss. 18: 97. 1900.

TYPE LOCALITY: "Common on the branches of the Columbia near its confluence with the Pacific." Collected by Douglas.

RANGE: Washington to north California.

SPECIMENS EXAMINED: Lower Cascades, *Suksdorf* in 1886; west Klickitat County, *Suksdorf* 1213; Cape Horn, *Piper* 5019.

According to Suksdorf there are two distinct subspecies, one distinguished by having much larger fruit than the other.

VALERIANACEAE. VALERIAN FAMILY.

Perennials; calyx limb of 5 to 15 plumose slender lobes, inrolled
  until fruiting .... VALERIANA.
Annuals; calyx limb obsolete or nearly so .... VALERIANELLA.

VALERIANA.

Leaflets thick, entire; root large, fusiform .... 1. *V. ceratophylla.*
Leaflets thin, mostly serrate; rootstocks creeping.
  Tube of corolla slender, twice as long as the limb; stamens
    included .... 3. *V. columbiana.*
  Tube of corolla short, less than twice the limb.
    Leaflets coarsely dentate .... 2. *V. sitchensis.*
    Leaflets entire or nearly so .... 2a. *V. sitchensis scouleri.*

1. **Valeriana ceratophylla** (Hook). TOBACCO ROOT.

Valeriana edulis Nutt.; Torr. & Gr. Fl. 2: 48. 1841.

Patrinia ceratophylla Hook. Fl. Bor. Am. 1: 290. 1833.

TYPE LOCALITY: "Common in low, wet soils between the Kettle Falls and Spokan." Collected by Douglas.

RANGE: British Columbia to Arizona and New Mexico and eastward to Ohio.

SPECIMENS EXAMINED: Klickitat County, *Howell;* Ellensburg, *Whited* 6; Sprague, *Henderson*, May 30, 1892; Spokane County, *Suksdorf* 329; Medical Lake, *Sandberg & Leiberg* 53; "Kettle Falls to Spokane, plentiful," *Douglas;* Pullman, *Piper* 1506; *Hull* 541; *Elmer* 822.

ZONAL DISTRIBUTION: Arid Transition.

2. **Valeriana sitchensis** Bong. Mem. Acad. St. Petersb. VI. 2: 145. 1832.

TYPE LOCALITY: Sitka.

RANGE: Alaska to Oregon and Idaho.

SPECIMENS EXAMINED: Olympic Mountains, *J. M. Grant* in 1890; Baldy Peak, *Lamb* 1339a; Mount Adams, *Henderson*, August 8, 1892; *Suksdorf* 467; Mashel River, *Piper* 2629; Silverton, *Bouck* 99; Goose Lake, *Flett* 1203; Nason Creek, *Sandberg & Leiberg* 691; Mount Rainier, *Piper*, August, 1895; Wenache Mountains, *Elmer* 440; Okanogan County, *Whited* 47, 182; Cascade Mountains, *Steinweg* in 1894; Horseshoe Basin, *Lake & Hull* 540; Blue Mountains, *Piper*, July 15, 1896; without locality, *Vasey* in 1889; Clallam County, *Elmer* 2792.

ZONAL DISTRIBUTION: Hudsonian.

In Cooper's Report, p. 64, this plant was erroneously referred to *V. capitata* Willd.

2a. Valeriana sitchensis scouleri (Rydberg).

Valeriana scouleri Rydberg, Mem. N. Y. Bot. Gard. **1**: 377. 1900.

Valeriana capitata hookeri Torr. & Gr. Fl. **2**: 48. 1841, not *V. hookeriana* Wight & Arn. 1834.

Type locality: "Moist rocks and islands of the Columbia River." Collected by Douglas and by Scouler.

Range: Washington and Oregon to Montana.

Specimens examined: Mount Baldy, Olympic Mountains, *Conard* 296; Lake Crescent, *Lawrence* 256; Eatonville, *Flett* 2204; Mashel River, *Piper* in 1889; Mount Rainier, *Allen* 243; Montesano, *Heller* 3937.

Zonal distribution: Canadian.

3. Valeriana columbiana Piper, Bot. Gaz. **22**: 489. 1896.

Type locality: Mountains near Wenache. Collected by Whited.

Range: Wenache Mountains.

Specimens examined: Mount Stuart, *Sandberg & Leiberg* 551; ridge west of Wenache, *Whited* 140.

Zonal distribution: Arid Transition.

Valeriana sylvatica Banks appears in Suksdorf's list, but we have been unable to find any good evidence that this species occurs within our limits.

VALERIANELLA.

Fruit obscurely keeled on the back; cotyledons incumbent.
Wings broad, as long as the body of the fruit .... 1. *V. macrocera.*
Wings narrow, shorter than the body of the fruit .... 2. *V. mamillata.*
Fruit strongly keeled on the back; cotyledons accumbent.
Flowers rose-color; fruit broadly winged .... 3. *V. congesta.*
Flowers pale or white.
Corolla spurless; fruit winged .... 4. *V. anomala.*
Corolla spurred.
Fruit winged .... 5. *V. aphanoptera.*
Fruit wingless .... 6. *V. samolifolia.*

Mr. Suksdorf erects the latter group of species into a genus, Aligera, and the former group he retains in Plectritis, considering both distinct from Valerianella.

1. Valerianella macrocera (Torr. & Gr.) A. Gray, Proc. Am. Acad. **19**: 83. 1883.

Plectritis macrocera Torr. & Gr. Fl. **2**: 50. 1841.

Aligera grayi Suksdorf, Deutsch. Bot. Monatss. **4**: 147. 1897.

Type locality: California. Collected by Douglas.

Range: Washington and Idaho to California and Arizona.

Specimens examined: Klickitat County, *Suksdorf* 23, 25, 218, 24, 5, 330; Ellensburg, *Piper*, May 20, 1897; *Whited* 311; North Yakima, *Mrs. Steinweg; Leckenby; Henderson: Flett* 1038; Tampico, *Flett* 1219; Wenache, *Whited* 1030; Pasco, *Piper* 2957; Douglas County, *Spillman:* Sprague, *Sandberg & Leiberg* 206; *Henderson*, May 20, 1892; Spokane, *Piper* 2945; Hangman Creek, *Sandberg & Leiberg* 60; Waitsburg, *Horner;* Pullman, *Piper* 1789; *Hull*; *Elmer* 179; Wawawai, *Piper* 1505; opposite Clarkston, *Horner* 32; without locality, *Vasey* in 1889; Snipes Mountain, *Cotton* 314; Rattlesnake Mountains, *Cotton* 335.

Zonal distribution: Arid Transition and Upper Sonoran.

Mr. Suksdorf considers that this species is really an aggregate of several, which he distinguishes as follows, so far as the Washington species are concerned:

Corolla pale, the limb equally 5-lobed.
Wings as long as the body of the fruit .... *V. grayi.*
Wings much shorter than the body of the fruit .... *V. mamillata.*

Corolla 2-lipped, rose-colored.
  Corolla 2 to 3 mm. long; spur 2 to 3 mm. long.
    Wings longer than the body of the fruit........................ *V. macroptera.*
    Wings shorter than the body of the fruit........................ *V. macrocera.*
  Corolla 1.5 mm. long; spur 1 mm. long.............................. *V. rubens.*

True *macrocera* on this basis is confined to California. The remaining segregates occur in Washington.

2. Valerianella mamillata (Suksdorf).

Aligera mamillata Suksd.; Deutsch. Bot. Monatss. **4:** 147. 1897.

TYPE LOCALITY: Simcoe Mountains, Washington.

RANGE: Known only from the type locality.

SPECIMENS EXAMINED: Simcoe Mountains, *Suksdorf.*

This species seems to us perfectly valid, the fruit appearing long-beaked partly owing to the short wings.

3. Valerianella congesta Lindl. Bot. Reg. **13:** *pl. 1094.* 1827.

Plectritis congesta DC. Prod. **4:** 631. 1830.

Plectritis microptera Suksdorf, Deutsch. Bot. Monatss. **4:** 119. 1897.

Betckea major Fisch. & Mey. Ind. Sem. Hort. Petrop. II. **5:** 30. 1837.

Plectritis major Hoeck; Engl. Bot. Jahrb. **3:** 37. 1882.

TYPE LOCALITY: "Native of the north-west coast of North America." Collected by Douglas in 1826.

RANGE: British Columbia to California in the coast region.

SPECIMENS EXAMINED: Coupeville, *Gardner* 147; Admiralty Head, *Piper*, May, 1898; Tacoma, *Flett* 55, 55; west Klickitat County, *Suksdorf*, May, 1881; Bingen, *Sheldon* 10220; Cape Horn, *Piper* 4984.

ZONAL DISTRIBUTION: Humid Transition.

Three forms of this plant occur as to fruit, one wingless (*major*), the second narrowly winged (*microptera*), the third broadly winged (*congesta*). They are considered distinct species by Suksdorf, but they do not differ in any character but the fruit. All three forms occur in Washington.

Plectritis congesta minor Hook.[a] has usually been considered a synonym of *V. macrocera*, but its type locality "near the mouth of the Columbia" is a region where *macrocera* is not known to occur.

4. Valerianella anomala A. Gray, Proc. Am. Acad. **19:** 83. 1883.

Plectritis anomala Suksdorf, Deutsch. Bot. Monatss. **4:** 144. 1897.

TYPE LOCALITY: "Wet grounds on the Columbia River and near it." Collected by Howell and by Suksdorf.

RANGE: Washington and Oregon.

SPECIMENS EXAMINED: Hoquiam, *Lamb* 1021; Klickitat County, *Suksdorf* 26; Bingen, *Sheldon* 10221.

ZONAL DISTRIBUTION: Humid Transition.

5. Valerianella aphanoptera A. Gray, Proc. Am. Acad. **19:** 83. 1883.

Plectritis aphanoptera Suksdorf, Deutsch. Bot. Monatss. **4:** 144. 1897.

TYPE LOCALITY: Klickitat County, Washington. Collected by Suksdorf.

RANGE: Washington and Oregon.

SPECIMENS EXAMINED: West Klickitat County, *Suksdorf*, June 9, 1882.

6. Valerianella samolifolia (DC.) A. Gray, Proc. Am. Acad. **19:** 83. 1883.

Betckea samolifolia DC. Prod. **4.** 642. 1830.

TYPE LOCALITY: "In pascuis montanis prope la Punta de Cortes Chilensium."

RANGE: Washington to California. Chile.

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[a] Fl. Bor. Am. **1:** 291. 1834.

Specimens examined: Admiralty Head, *Piper* in 1898; west Klickitat County, *Suksdorf* 111, 332; Port Crescent, *Lawrence* 263.

Zonal distribution: Humid Transition.

Valerianella olitoria (L.) Poll., the cultivated "corn salad," is an occasional garden escape.

DIPSACEAE.

1. DIPSACUS.

1. **Dipsacus sylvestris** Mill. Gard. Dict. ed. 8. no. 1. 1768. Teasel.

Type locality: European.

Specimens examined: Port Townsend, *Edwards*, July, 1896; Spokane *Dewart*, August 20, 1902; Waitsburg, *Piper*, July 19, 1896.

CUCURBITACEAE. Gourd Family.

1. MICRAMPELIS.

1. **Micrampelis oregana** (Torr. & Gr.) Greene, Pittonia **2**: 129. 1890.

Megarrhiza oregana Torr. Pac. R. Rep. **6**: 74. 1855.

Sicyos oreganus Torr. & Gr. Fl. **1**: 542. 1840.

Echinocystis oregana Cogn. Mem. Cour. Ac. Belg. **28**: 87. 1878.

Sicyos angulatus L. err. det. Hook. Fl. Bor. Am. **1**: 220. 1834.

Type locality: "On the Oregon from near its mouth to Kettle Falls." Collected by Scouler, Douglas, and Tolmie.

Range: British Columbia to California in the coast region. Umatilla County, Oregon.

Specimens examined: Montesano, *Heller* 3873; Orcas Island, *Lyall* in 1858; Tacoma, *Flett* 184; East Sound, *Henderson*, July, 1892; Fort Vancouver, *Tolmie;* west Klickitat County, *Suksdorf* 127.

Zonal distribution: Humid Transition.

CAMPANULACEAE. Bluebell Family.

Corolla regular; anthers separate.
  Calyx lobes narrow; capsules opening by small valve-like lateral openings.
    Corolla rotate; earlier flowers cleistogamous........... Specularia (p. 536).
    Corolla campanulate; no cleistogamous flowers......... Campanula (p. 536).
  Calyx lobes large, foliaceous.
    Corolla tubular-campanulate; capsule opening by a hole at the apex; no cleistogamous flowers.............. Githopsis (p. 535).
    Corolla open-campanulate; capsules bursting irregularly; earlier flowers cleistogamous......................... Heterocodon (p. 537).
Corolla irregular; anthers united.
  Tube of the corolla cleft to the base on one side........... Rapuntium (p. 537).
  Tube of the corolla very long, not cleft..................... Bolelia (p. 537).

GITHOPSIS.

1. **Githopsis specularioides** Nutt. Trans. Am. Phil. Soc. **8**: 258. 1843.

Type locality: "Plains near the outlet of the Wahlamet," Oregon. Collected by Nuttall.

Range: Washington to California.

Specimens examined: American Lake, *Flett*, June 10, 1895; foothills, Blue Mountains, *Horner* 158; Waitsburg, *Horner* 402; without locality, *Cooper;* Almota, *Sheldon* in 1898.

Zonal distribution: Transition.

SPECULARIA.

1. **Specularia perfoliata** (L.) A. DC. Monogr. Camp. 351. 1830.

VENUS'S LOOKING-GLASS.

Campanula perfoliata L. Sp. Pl. **1**: 169. 1753.

Legouzia perfoliata Britton, Mem. Torr. Club **5**: 309. 1894.

TYPE LOCALITY: "Habitat in Virginia."

RANGE: Washington to Canada, southward to Utah and Texas. Mexico.

SPECIMENS EXAMINED: Whidby Island, *Gardner* 186; Charleston, *Piper*, July 21, 1895; Bingen, *Suksdorf* 1548; Columbia Valley, *Lyall* in 1860; Fort Vancouver, *G. H. Hicks*, June 24, 1890; Spokane, *Henderson*, July 10, 1892; Almota, *Lake & Hull* 558; Wawawai, *Elmer* 756; *Piper* 1888; Clarks Springs, Spokane County, *Kreager* 901.

ZONAL DISTRIBUTION: Upper Sonoran and Transition.

CAMPANULA.

Corolla lobes spreading; style longer than the corolla................. 1. *C. scouleri*.
Corolla lobes erect; style included.
  Herbage puberulent; leaves all entire............................ 4. *C. scabrella*.
  Herbage glabrous; at least the basal leaves not entire.
    Cauline leaves linear, entire; basal orbicular or cordate...... 2. *C. rotundifolia*.
    Cauline leaves spatulate-lanceolate, dentate; basal similar.... 3. *C. piperi*.

1. **Campanula scouleri** Hook.; A. DC. Monog. Camp. 312. 1830.

TYPE LOCALITY: "Fort Vancouver on the Columbia," Washington. Collected by Scouler.

RANGE: Alaska to California west of the Cascade Mountains.

SPECIMENS EXAMINED: Montesano, *Heller* 3956; Orchard Point, *Piper*, July, 1895; Seattle, *Piper* 127; upper Nisqually Valley, *Allen* 21; Falcon Valley, *Suksdorf* 76; McAllisters Lake, *Henderson*, June 22, 1892; Fort Vancouver, *Tolmie;* Tumwater Canyon, Wenache River, *Whited* 1454; without locality, *Vasey* 389, 387; Clallam County, *Elmer* 2741.

ZONAL DISTRIBUTION: Humid Transition.

Hooker[a] distinguishes two subspecies as follows: *C. scouleri hirsutula*, with the calyx lobes erect, and *C. scouleri glabra*, with the calyx lobes open-spreading.

2. **Campanula rotundifolia** L. Sp. Pl. **1**: 163. 1753.

Campanula linifolia DC. err. det. Hook. Fl. Bor. Am. **2**: 27. 1834.

TYPE LOCALITY: European.

RANGE: Alaska to Labrador, south to Mexico, Nebraska, and Pennsylvania. Europe. Asia.

SPECIMENS EXAMINED: Mount Rainier, *Flett* 257; *Piper*, August 1895, 467; Cascade Mountains, latitude 49°, *Lyall;* Woodlawn, *Henderson*, June 22, 1892; Falcon Valley, *Suksdorf* 1549; Fish Lake, *Dunn*, August 8, 1900; Horseshoe Basin, *Lake & Hull* 557; Spokane, *Piper*, July 18, 1894; Spokane Region, *Spalding;* Silverton, *Bouck* 118; Loon Lake, *Winston*, July 20, 1897; without locality, *Vasey* in 1889; Clallam County, *Elmer* 2742; Tumwater Canyon, *Whited* 1454.

ZONAL DISTRIBUTION: Transition to Hudsonian.

This species is very variable and has been considered an aggregate of several species. Our ordinary form with erect sepals and thickish leaves accords with *C. petiolata* DC.[b]

3. **Campanula piperi** Howell, Fl. N. W. Am. **1**: 409. 1901.

TYPE LOCALITY: Mount Steele, Olympic Mountains, Washington.

RANGE: Olympic Mountains, Washington.

SPECIMENS EXAMINED: Olympic Mountains, *Flett* 125, 814; *Elmer* 2743; Mount Steele, *Piper* 2217; Mount Storm King, *Lawrence* 342.

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[a] Fl. Bor. Am. **2**: 28. 1834.

[b] Monogr. Camp. 278. 1830.

ZONAL DISTRIBUTION: Arctic.

This species is allied to *C. aurita* Greene of Alaska, to which it has been referred.

4, **Campanula scabrella** Engelm. Bot. Gaz. **6**: 237. 1881.

TYPE LOCALITY: "On bleak rocky ridge of Scott Mountain, west of Mt. Shasta," California.

RANGE: Washington to California.

SPECIMENS EXAMINED: Wenache Mountains, *Brandegee* 937; Mount Stuart, *Brandegee* 938; Mount Adams, *Henderson*, August 10, 1892; *Suksdorf* 38; *Howell* 418.

ZONAL DISTRIBUTION: Arctic.

HETEROCODON.

1. **Heterocodon rariflorum** Nutt. Trans. Am. Phil. Soc. **8**: 255. 1843.

TYPE LOCALITY: "Grassy plains of the Wahlamet and Oregon," Oregon. Collected by Nuttall.

RANGE: British Columbia to Idaho and California.

SPECIMENS EXAMINED: Naches River, *Henderson*, June 13, 1892; Peshastin, *Sandberg & Leiberg* 584; Glenwood, *Flett* 1209; Klickitat River, *Flett* 1147; Pullman, *Piper* 1855, 1718; without locality, *Cooper;* Clarks Springs, *Kreager* 14.

ZONAL DISTRIBUTION: Transition.

RAPUNTIUM. LOBELIA.

Aquatic; leaves all basal, terete, hollow .... 1. *R. dortmanna.*
Terrestrial; stems leafy .... 2. *R. kalmii.*

1. **Rapuntium dortmanna** (L.) Presl, Prod. Mon. Lobel. 18. 1836.

Lobelia dortmanna L. Sp. Pl. **2**: 929. 1753.

TYPE LOCALITY: "Habitat in Europae frigidissimae lacubus & ripis."

RANGE: Subarctic regions, southward to Washington and Pennsylvania. Europe.

SPECIMENS EXAMINED: Whatcom County, *Suksdorf* 983; *Gardner* 412; Lake Crescent, *Lawrence* 312.

2. **Rapuntium kalmii** (L.) Presl, Prod. Monogr. Lobel. 23. 1836.

Lobelia kalmii L. Sp. Pl. **2**: 930.

TYPE LOCALITY: "Habitat in Canada."

RANGE: Washington to Nova Scotia, south to Ohio and New Jersey.

SPECIMENS EXAMINED: Priest Rapids, *Cotton* 1382.

BOLELIA.

1. **Bolelia elegans** (Dougl.) Greene, Pittonia **2**: 126. 1890.

Clintonia elegans Dougl. Bot. Reg. **15**: *pl. 1241*. 1829.

Downingia elegans Torr. Bot. Wilkes Exped. **2**: 375. 1874.

TYPE LOCALITY: "On the plains of the Columbia near Walla Walla River and near the head springs of the Multnomah." Collected by Douglas.

RANGE: Washington and Idaho to California.

SPECIMENS EXAMINED: Harrison, *H. H. Garretson* in 1895; Manor, Clarke County, *Piper*, July 14, 1897; Centralia, *Lamb* 1129; Colville, *Watson* in 1880; Lake Kalispel, *Kreager*, August 9, 1902 and 316; Spokane, *Henderson*, July 9, 1892; Crab and Wilson creeks, *Sandberg & Leiberg* 287; Pullman, *Hull* 454; *Piper* 1728; without locality, *Vasey* in 1889.

ZONAL DISTRIBUTION: Transition.

CICHORIACEAE. CHICORY FAMILY.

Pappus none; akenes 20 to 30-nerved; flowers yellow .... LAPSANA (p. 538).
Pappus present.
  Bristles of pappus scale-like or plumose.

- Flowers not yellow.
  - Akenes beaked; pappus brown, plumose; flowers violet. TRAGOPOGON (p. 539).
  - Akenes beakless.
    - Pappus a crown of short scales; flowers blue.... CICHORIUM (p. 538).
    - Pappus plumose; flowers pink or white......... PTILORIA (p. 539).
- Flowers yellow.
  - Receptacle chaffy; pappus bristles plumose, not broadened at base.................................. HYPOCHAERIS (p. 541).
  - Receptacle naked; pappus scale-like, or the bristles broadened at base.
    - Heads nodding when young; scales 15 to 20, each bearing a very plumose awn.................. PTILOCALAIS (p. 541).
    - Heads erect even when young.
      - Pappus of plumose or subplumose bristles slightly enlarged at base.
        - Heads solitary on bractless scapes or peduncles.......................... SCORZONELLA (p. 540).
        - Heads usually several on branching bracteolate scapes.................. LEONTODON (p. 541).
      - Pappus of chaff-like scales.
        - Scales 20 to 24, linear-lanceolate, not awned.............................. NOTHOCALAIS (p. 540).
        - Scales 5 to 10, awned, the awn rising from the notched apex.............. UROPAPPUS (p. 539).

Bristles of pappus capillary, never plumose.

- Heads solitary; leaves all basal.
  - Akenes smooth at apex, beakless or long-beaked..... AGOSERIS (p. 541).
  - Akenes spinulose at apex, long-beaked.............. TARAXACUM (p. 545).
- Heads several; leaves not all basal.
  - Akenes flattened.
    - Flowers yellow; akenes truncate, not beaked.... SONCHUS (p. 549).
    - Flowers blue, pink, or yellow; akenes narrow at summit or beaked........................... LACTUCA (p. 548).
  - Akenes terete, cylindric or prismatic.
    - Pappus white, persistent....................... CREPIS (p. 545).
    - Pappus tawny.
      - Flowers yellow (or in one species white).... HIERACIUM (p. 546).
      - Flowers pinkish........................... NABALUS (p. 548.)

LAPSANA.

1. **Lapsana communis** L. Sp. Pl. **2**: 811. 1753.

TYPE LOCALITY: European.

SPECIMENS EXAMINED: Seattle, *Piper* in 1888; west Klickitat County, ***Suksdorf*** **146**; Vancouver, *Piper*, July 10, 1899.

CICHORIUM.

1. **Cichorium intybus** L. Sp. Pl. **2**: 813. 1753. CHICORY.

TYPE LOCALITY: "Hab. in Europa ad margines agrorum viarumque."

SPECIMENS EXAMINED: Seattle, *Piper* in 1892.

PTILORIA.

Pappus bristles fuscous, short-plumose to the base.................... 1. *P. paniculata.*
Pappus bristles white.
  Plumose to the very base.................................. 2. *P. tenuifolia.*
  Plumose only above the middle.............................. 3. *P. exigua.*

1. **Ptiloria paniculata** (Nutt.) Greene, Pittonia **2**: 132. 1890.
Stephanomeria paniculata Nutt. Trans. Am. Phil. Soc. **7**: 428. 1841.
Type locality: "On the Rocky Mountain plains towards the Colorado."
Range: Washington and Idaho to Nevada.
Specimens examined: North Yakima, *Piper* 2757; Pasco, *Henderson*, June 12, 1892; west Klickitat County, *Suksdorf* 982; Major Creek, *Suksdorf* in 1882; Rock Island, *Sandberg & Leiberg* 433; White Bluff Ferry, *Lake & Hull* 690; Wawawai, *Piper*, July 31, 1893.
Zonal distribution: Upper Sonoran.

2. **Ptiloria tenuifolia** (Torr.) Raf. Atl. Journ. 145. 1832.
Prenanthes ? tenuifolia Torr. Ann. Lyc. N. Y. **2**: 210. 1828.
Lygodesmia minor Hook. Fl. Bor. Am. **1**: 205. 1833.
Stephanomeria minor Nutt. Trans. Am. Phil. Soc. **7**: 427. 1841.
Ptiloria filifolia Greene, Pittonia **3**: 311. 1898.
Type locality: "Rocky Mountains." Collected by James.
Range: British Columbia to California and Texas.
Specimens examined: Twisp River, *Whited*, July 20, 1896; Wenache, *Whited* 8, 2582, 1311; *Elmer* 479; White Bluff Ferry, *Lake & Hull* 812; North Yakima, *Watt*, August, 1895; Ellensburg, *Piper* 2747; *Whited* 561; without locality, *Vasey* 555; without locality, *Brandegee* 934, 935; Fort Walla Walla, *Lyall* in 1860; Spokane, *Kreager* 530; Kittitas Valley, *J. Howell* in 1877.
Zonal distribution: Upper Sonoran and Arid Transition.

3. **Ptiloria exigua** (Nutt.) Greene, Pittonia **2**: 132. 1890.
Stephanomeria exigua Nutt. Trans. Am. Phil. Soc. **7**: 428. 1841.
Type locality: "On the Rocky Mountain plains toward the Colorado."
Range: Washington and Wyoming to California and Texas.
Specimens examined: North of Morgans Ferry, *Suksdorf* 377; North Yakima, *Watt*, August, 1895.
Zonal distribution: Upper Sonoran.

TRAGOPOGON.

1. **Tragopogon porrifolius** L. Sp. Pl. **2**: 789. 1753. Salsify. Oyster plant.
Type locality: Not given.
Specimens examined: Ellensburg, *Elmer*, July, 1897.

UROPAPPUS.

1. **Uropappus linearifolia** (DC.) Nutt. Trans. Am. Phil. Soc. **7**: 425. 1841.
Microseris linearifolia Schultz Bip. Pollichia **22–24**: 308. 1866.
Calais linearifolia DC. Prod. **7**: 85. 1838.
Calais macrochaeta A. Gray, Pl. Fendl. 112. 1849.
Microseris macrochaeta Schultz Bip. Pollichia **22–24**: 309. 1866.
Type locality: "In California legit cl. Douglas et circa Fort Vancouver cl. Garry."
Range: Washington and Idaho to California and New Mexico.
Specimens examined: West Klickitat County, *Suksdorf*, April, May, 1886; Rockland, *Suksdorf*, April 10, 1886; Almota, *Piper*, June 3, 1893.
Zonal distribution: Upper Sonoran.

Calais macrochaeta Gray is founded upon immature specimens collected by Spalding on the Clearwater, Idaho. They are undoubtedly young plants of *C. linearifolia*, as the pappus of that species shows just the transitions from young flowers to adult akenes needed to connect the differences supposed to be specific.

NOTHOCALAIS.

1. **Nothocalais troximoides** (A. Gray) Greene, Bull. Cal. Acad. **2**: 55. 1886.

Microseris troximoides A. Gray, Proc. Am. Acad. **9**: 211. 1874.

Nothocalais suksdorfii Greene, Bull. Cal. Acad. **2**: 54. 1886.

TYPE LOCALITY: "From the hills on the Clearwater River," Idaho. Collected by Spalding.

RANGE: Idaho and Washington to California.

SPECIMENS EXAMINED: Ellensburg, *Piper* 2678; *Kincaid* 344; North Yakima, *Mrs. Steinweg* in 1894; *Leckenby*, April 22, 1898; west Klickitat County, *Suksdorf*, April, May, 1886; Klickitat County, *Howell*, June, 1879; Wenache, *Whited* 78, 1038; Rattlesnake Mountains, *Cotton* 323; Sprague, *Sandberg & Leiberg* 147; Spangle, *Piper* 2438; Spokane, *Henderson*, May 31, 1892; Hangman Creek, *Sandberg & Leiberg* 38; Blue Mountains, *Piper* 2439; Walla Walla region, *Brandegee* 929; Waitsburg, *Horner* 325; Mabton, *Cotton* 747; Prosser, *Cotton* 585.

ZONAL DISTRIBUTION: Arid Transition.

The distinctions relied upon by Professor Greene to separate two supposed species seem too unstable. In the type specimen of *troximoides* the paleae are not "very unequal."

SCORZONELLA.

Leaves all basal, entire or nearly so .... 1. *S. borealis.*
Leaves mostly dentate or lobed, one or more cauline.
  Pappus scales each attenuate into an awn-like tip.................. 2. *S. leptosepala.*
  Pappus scales abruptly awned.
    Involucre 1 to 1.5 cm. high; base of the pappus scales as long as or longer than the akenes .... 3. *S. bolanderi.*
    Involucre 2 to 2.5 cm. high; base of the pappus scales much shorter than the akene.................................... 4. *S. laciniata.*

1. **Scorzonella borealis** Greene, Pittonia **2**: 19. 1889.

Apargia boreale Bong. Mem. Acad. St. Petersb. VI. **2**: 146. 1832.

Leontodon boreale DC. Prod. **7**: 102. 1838.

Apargidium boreale Torr. & Gr. Fl. **2**: 474. 1843.

Microseris borealis Schultz Bip. Pollichia **22-24**: 310. 1866.

TYPE LOCALITY: Sitka.

RANGE: Alaska to California.

SPECIMENS EXAMINED: Mount Rainier, *Flett* 281; *Greene* in 1889; without locality, *Tolmie*.

ZONAL DISTRIBUTION: Hudsonian.

2. **Scorzonella leptosepala** Nutt. Trans. Am. Phil. Soc. **7**: 426. 1841.

Microseris leptosepala (Nutt.) A. Gray, Proc. Am. Acad. **9**: 209. 1874.

TYPE LOCALITY: "Near the outlet of the Wahlamet." Collected by Nuttall.

RANGE: Washington to California in the coast region.

SPECIMENS EXAMINED: Falcon Valley, *Suksdorf* 147, 148, 149, June 26, 1886.

3. **Scorzonella bolanderi** (A. Gray) Greene, Bull. Cal. Acad. **2**: 54. 1886.

Microseris bolanderi A. Gray, Proc. Am. Acad. **19**: 64. 1883.

Calais bolanderi A. Gray, Proc. Am. Acad. **7**: 365. 1867.

TYPE LOCALITY: Fort Bragg, Mendocino County, Cal.

RANGE: Washington to California, near the coast.

SPECIMENS EXAMINED: Seattle, *Mrs. Summers*, a doubtful, immature specimen.

4. **Scorzonella laciniata** (Hook.) Nutt. Trans. Am. Phil. Soc. 7: 426. 1841.

Hymenonema ? laciniatum Hook. Fl. Bor. Am. 1: 301. 1833.

Microseris laciniata Schultz Bip. Pollichia 22-24: 309. 1866.

Type locality: "Dry plains of the Columbia from the Rocky Mountains to the ocean." Collected by Douglas.

Range: Washington to California.

Specimens examined: Montesano, *Henderson;* Humptulips, *Lamb* 1184; Tacoma, *Flett* 174; Muckleshoot Prairie, *Dr. Ruhn;* Falcon Valley, *Suksdorf,* July 17, 1886; Steilacoom Prairie, *Piper* 376.

Zonal distribution: Humid Transition.

PTILOCALAIS.

1. **Ptilocalais nutans** (Geyer) Greene, Bull. Cal. Acad. 2: 54. 1886.

Scorzonella nutans Geyer; Hook. Lond. Journ. Bot. 6: 253. 1847.

Microseris nutans Schultz Bip. Pollichia 22-24: 308. 1866.

Type locality: "Declivities of Spokan and Coeur d'Aleine Mountains." Collected by Geyer.

Range: British Columbia and Montana to Colorado and California.

Specimens examined: Klickitat River, *Flett* 1101; Falcon Valley, *Suksdorf* 420; Simcoe Mountains, *Howell,* July, 1879; Cascade Mountains to Colville, latitude 49°, *Lyall* in 1860; North Fork Columbia, *Wilkes Expedition;* Wenache Mountains, *Elmer* 450; Roslyn, *Whited* 413; Easton, *Henderson,* June 11, 1892; Sprague, *Henderson,* May 3, 1892; *Sandberg & Leiberg,* June, 1893; Spokane, *Henderson,* May 30, 1892; *Piper* 2266; Blue Mountains, *Piper,* July 15, 1896; Pullman, *Piper* 1612; *Hull* 716; without locality, *Vasey* 552; west Klickitat County, *Suksdorf* 981, 285.

Zonal distribution: Arid Transition and Canadian.

HYPOCHAERIS.

1. **Hypochaeris radicata** L. Sp. Pl. 2: 811. 1753. Gosmore.

Type locality: European.

Specimens examined: Whidby Island, *Gardner* 378; Seattle, *Piper,* July 17, 1897; Chehalis County, *Lamb* 1404; Tacoma, *Flett* 20.

An exceedingly troublesome weed in lawns, now spread over most of Western Washington. One of Flett's specimens was erroneously referred by Wiegand[a] to *H. glabra* L., a species not known to occur in Washington.

LEONTODON.

1. **Leontodon autumnale** L. Sp. Pl. 2: 798. 1753. Fall dandelion.

Type locality: European.

Specimens examined: Seattle, *Piper* 750.

AGOSERIS.

Akenes beakless; leaves glabrous; alpine plant....................... 1. *A. alpestris.*

Akenes beaked.

Leaves glaucous; beak of akene short, stout, nerved............ 2. *A. glauca.*

Leaves not glaucous; beak of akene slender, nerveless.

Beak about as long as the body of the akene.

Flowers orange; leaves mostly entire.

Leaves lanceolate-spatulate; beak shorter than the akene.................................... 3. *A. aurantiaca.*

Leaves narrowly linear; beak longer than the akene. 4. *A. gracilenta.*

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[a] Bull. Torr. Club 24: 343. 1897.

- Flowers yellow; leaves mostly lobed.
  - Akenes with beak 12 to 15 mm. long; leaves mostly entire.. 5. *A. elata.*
  - Akenes with beak 8 to 10 mm. long; leaves mostly lobed.. 6. *A. apargioides.*

Beak much longer than the body of the akene.

- Annuals; heads small................................ 10. *A. heterophylla.*
- Perennials; heads large.
  - Apex of akene truncate; herbage tomentose....... 7. *A. retrorsa.*
  - Apex of akene attenuate.
    - Heads 2 cm. high............................ 8. *A. laciniata.*
    - Heads 2.5 to 3 cm. high...................... 9. *A. grandiflora.*

1. Agoseris alpestris (A. Gray) Greene, Pittonia **2**: 177. 1891.

Troximon alpestre A. Gray, Proc. Am. Acad. **19**: 70. 1883.

TYPE LOCALITY: Mount Adams, Washington. Collected by Suksdorf.

RANGE: Cascade Mountains of Washington and Oregon.

SPECIMENS EXAMINED: Mount Rainier, *Flett* 248, 273, 272; *Piper* 2140, 493; *Allen* 288; Mount Adams, *Suksdorf* 422; near Mount Adams, *Henderson*, August 5, 1892.

ZONAL DISTRIBUTION: Arctic.

2. Agoseris glauca (Nutt.) Greene, Pittonia **2**: 177. 1891.

Troximon glaucum Nutt. Gen. **2**: 128. 1818.

TYPE LOCALITY: "On the banks of the Missouri."

RANGE: British Columbia and Alberta to Oregon, Colorado, and Dakota.

SPECIMENS EXAMINED: Cascade Mountains, latitude 49°, *Lyall* in 1860; Ellensburg, *Whited* 507; Toppenish, *Henderson*, May 28, 1892; Peshastin, *Sandberg & Leiberg* 490; Spangle, *Piper* 2873; Spokane, *C. A. Ramm* in 1883; Spokane County, *Suksdorf* 383; Beaver Creek, *Whited* 233; Loomis, *Elmer* 552; Pullman, *Piper* 3, 1769, 1862; Union Flat, *Hull*, July 18, 1892; Waitsburg, *Horner* 345; Walla Walla Region, *Brandegee* 930; without locality, *Vasey* 557; Clarks Springs, *Kreager* 104.

ZONAL DISTRIBUTION: Arid Transition.

2a. Agoseris glauca scorzoneraefolia (Schrad.).

Ammogeton scorzoneraefolium Schrad. Cat. Sem. Goett. 7. 1833.

Troximon glaucum dasycephalum Torr. &. Gr. Fl. **2**: 490. 1843.

Agoseris scorzoneraefolia Greene, Pittonia **2**: 177. 1891.

TYPE LOCALITY: "America borealis arctica."

RANGE: Nearly identical with that of *A. glauca.*

SPECIMENS EXAMINED: Spokane County, *Geyer* 666; Fort Simcoe, *Lyall* in 1860; Pullman, *Piper* 3027, 3029, 3536.

This plant differs from *A. glauca* only in having a pubescent involucre. It is scarcely worth nomenclatorial recognition.

2b. Agoseris glauca aspera (Rydberg).

Agoseris leontodon asperum Rydberg, Mem. N. Y. Bot. Gard. **1**: 457. 1900.

Troximon glaucum asperum Piper, Mazama **2**: 96. 1901.

TYPE LOCALITY: Mount Chauvet, Idaho.

RANGE: Washington to Montana.

SPECIMENS EXAMINED: Mount Rainier, *Piper* 2149; *Allen* 226; Wenache Mountains, *Elmer* 455; North Fork Bridge Creek, *Elmer* September, 1897.

ZONAL DISTRIBUTION: Arctic.

3. Agoseris aurantiaca (Hook.) Greene, Pittonia **2**: 177. 1891.

Troximon aurantiacum Hook. Fl. Bor. Am. **1**: 300. *pl. 104*. 1833.

TYPE LOCALITY: "Alpine prairies of the Rocky Mountains."

RANGE: British Columbia and Saskatchewan to California and Colorado.

SPECIMENS EXAMINED: Mount Rainier, *Tolmie; Allen* 37, 287; *Piper* 2145, 2157; Mount Adams, *Suksdorf* 196, 575; Skamania County, *Suksdorf;* Klickitat River, *Henderson*, August 3, 1892; Atanum River, *Henderson*, August 3, 1892; east side Cascade Mountains, *Lyall* in 1860; Wenache Mountains, *Elmer* 445, 451; between Wenache and Ellensburg, *Whited*, August 13, 1896; Horseshoe Basin, *Lake & Hull*, August 24, 1892.

ZONAL DISTRIBUTION: Hudsonian and Arctic.

4. **Agoseris gracilenta** (A. Gray) Greene, Pittonia **2**: 177. 1891.

Troximon gracilens A. Gray, Proc. Am. Acad. **19**: 71. 1883.

TYPE LOCALITY: "Cascade Mountains of Oregon and Washington Terr." Collected by Lyall, by Nevius, and by Suksdorf.

RANGE: Washington and Oregon to Wyoming.

SPECIMENS EXAMINED: Olympic Mountains, *Piper* 2198; Cascade Mountains, latitude 49°, *Lyall* in 1860; Mount Adams, *Suksdorf* 425, 576; Skamania County, *Suksdorf*, August 10, 1886; Leavenworth, *Savage* 29; Nason Creek, *Sandberg & Leiberg* 835; along Salmon River, *Horner* 346; without locality, *Brandegee* 931.

ZONAL DISTRIBUTION: Hudsonian.

5. **Agoseris elata** (Nutt.) Greene, Pittonia **2**: 177. 1891.

Stylopappus elatus Nutt. Trans. Am. Phil. Soc. **7**: 433. 1841.

Macrorhynchus elatus Torr. & Gr. Fl. **2**: 492. 1843.

Troximon nuttallii A. Gray, Proc. Am. Acad. **9**: 216. 1874.

TYPE LOCALITY: "Plains of the Wahlamet near its estuary," Oregon. Collected by Nuttall.

RANGE: Washington to California in the coast region.

SPECIMENS EXAMINED: Coupeville, *Gardner;* Olympia, *Henderson* 1683; Klickitat River, *Suksdorf* 577; Falcon Valley, *Suksdorf* 578.

ZONAL DISTRIBUTION: Humid Transition.

6. **Agoseris apargioides** (Less.) Greene, Pittonia **2**: 177. 1891.

Troximon apargioides Less. Linnaea **6**: 501. 1831.

Agoseris maritima Sheldon, Bull. Torr. Club **30**: 310. 1903.

TYPE LOCALITY: California.

RANGE: Washington to California.

SPECIMENS EXAMINED: Westport, *Henderson* in 1892; Ilwaco, *Piper* 4960.

Mr. Sheldon regards the northern plant as distinct from the Californian, which may prove to be the case. It is possible, also, that this is *Leontodon hirsutum* Hook.[a] (*Agoseris hirsuta* Greene[b]), the type of which is said to have been collected by Douglas and by Scouler on "Menzies Island and sandy banks of the Columbia," and which is referred by A. Gray[c] to *Troximon humile.*

We have seen no specimens of *Troximon humile* A. Gray (*Macrorhynchus humilis* Benth.) from Washington, and doubt its occurrence.

7. **Agoseris retrorsa** (Benth.) Greene, Pittonia **2**: 178. 1891.

Macrorhynchus retrorsus Benth. Pl. Hartw. 320. 1849.

Troximon retrorsum A. Gray, Proc. Am. Acad. **9**: 216. 1874.

Macrorhynchus angustifolius Kellogg, Proc. Cal. Acad. **5**: 47. 1873.

TYPE LOCALITY: "In montibus Sacramento," California.

RANGE: Washington to California.

SPECIMENS EXAMINED: West Klickitat County, *Suksdorf* 579; Clealum, *Henderson* in 1892; Wenache, *Whited* 1232.

ZONAL DISTRIBUTION: Arid Transition.

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[a] Fl. Bor. Am. **1**: 296. 1833. [b] Pittonia **2**: 177. 1891. [c] Syn. Fl. 1²: 439. 1886.

8. **Agoseris laciniata** (Nutt.) Greene, Pittonia 2: 178. 1891.

Stylopappus laciniatus Nutt. Trans. Am. Phil. Soc. 7: 432. 1841.

Macrorhynchus laciniatus Torr. & Gr. Fl. 2: 492. 1843.

TYPE LOCALITY: "Plains of the Wahlamet, near its estuary," Oregon. Collected by Nuttall.

RANGE: British Columbia to California west of the Cascade Mountains.

SPECIMENS EXAMINED: Seattle, *Piper*, July, 1891: Nisqually Valley, *Allen* 225; *Wilkes Expedition;* Puget Sound, *Cooper;* Nason Creek, *Sandberg & Leiberg* 612.

ZONAL DISTRIBUTION: Humid Transition.

9. **Agoseris grandiflora** (Nutt.) Greene, Pittonia 2: 178. 1891.

Stylopappus grandiflorus Nutt. Trans. Am. Phil. Soc. 7: 432. 1841.

Macrorhyncus grandiflorus Torr. & Gr. Fl. 2: 492. 1843.

Troximon grandiflorum A. Gray, Proc. Am. Acad. 9: 216. 1874.

Troximon grandiflorum obtusifolium Suksdorf, Deutsch. Bot. Monatss. 18: 98. 1900.

TYPE LOCALITY: "High plains of the Wahlamet," Oregon. Collected by Nuttall.

RANGE: Washington and Idaho to California.

SPECIMENS EXAMINED: West Klickitat County, *Suksdorf* 37, 2025; Pullman, *Piper* 1616; Tukanon River, *Lake & Hull*, July 1, 1892.

Exceedingly variable as to foliage, but as all forms occur together the variations do not seem worthy of naming.

ZONAL DISTRIBUTION: Humid Transition.

10. **Agoseris heterophylla** (Nutt.) Greene, Pittonia 2: 178. 1891.

Macrorhynchus heterophyllus Nutt. Trans. Am. Phil. Soc. 7: 430. 1841.

Troximon heterophyllum Greene, Bull. Torr. Club 10: 88. 1883.

Troximon heterophyllus kymapleura Greene, Bull. Torr. Club 10: 88. 1883.

Agoseris heterophylla kymapleura Greene, Pittonia 2: 179. 1891.

TYPE LOCALITY: "Plains of Oregon."

RANGE: Washington to California.

SPECIMENS EXAMINED: Spokane, *Suksdorf* 581; Pullman, *Piper* 1617, 1859, 3098.

ZONAL DISTRIBUTION: Arid Transition.

10a. **Agoseris heterophylla normalis** subsp. nov.

Herbage hirsute or villous; akenes 10-striate or 10-costate.

The fact seems to have been overlooked that the name *A. heterophylla* belongs to the plant commonly called *A. heterophylla kymapleura* and that the commonest form of this remarkably variable species has never been christened.

SPECIMENS EXAMINED: West Klickitat County, *Suksdorf* 1648, 2312; Ellensburg, *Piper* 2688; Falcon Valley, *Suksdorf* 580; Wenache, *Whited* 1094, in 1895; Spokane, *Kreager* 165; Hangman Creek, *Sandberg & Leiberg* 59; without locality, *Vasey* 559, 560; without locality, *Brandegee* 928; along Tukanon River, *Lake & Hull*, July 5, 1892.

ZONAL DISTRIBUTION: Arid Transition.

10b. **Agoseris heterophylla californica** (Nutt.)

Cryptopleura californica Nutt. Trans. Am. Phil. Soc. 7: 430. 1841.

Troximon heterophyllum cryptopleura Greene, Bull. Torr. Club 10: 88. 1883.

Agoseris heterophylla cryptopleura Greene, Pittonia 2: 179. 1891.

Troximon heterophyllum cryptopleuroides Suksdorf, Deutsch. Bot. Monatss. 18: 98. 1900.

TYPE LOCALITY: "Near Santa Barbara," California.

RANGE: Washington to California.

SPECIMENS EXAMINED: West Klickitat County, *Suksdorf* 1648, 2313, 583, 582.

10c. **Agoseris heterophylla glabrata** (Suksdorf).

Troximon heterophyllum glabratum Suksdorf, Deutsch. Bot. Monatss. 18: 98. 1900.

Agoseris heterophylla glabra Howell, Fl. N. W. Am. 402. 1901.

Type locality: Klickitat County, Washington.
Range: Washington and Oregon.
Specimens examined: West Klickitat County, *Suksdorf* 2312.

TARAXACUM.

1. **Taraxacum taraxacum** (L.) Karst. Deutsch. Fl. 1138. 1880–83. Dandelion.
Leontodon taraxacum L. Sp. Pl. **2**: 798. 1753.
Taraxacum officinale Weber, Prim. Fl. Hols. 56. 1780.
Type locality: "Hab. in Europae pascuis."
The common dandelion is established as a weed in nearly all parts of the State.

CREPIS.

- Akenes dilated at the insertion of the pappus; low glaucous plant with running rootstocks .... 1. *C. nana.*
- Akenes not dilated at the insertion of the pappus; plants without rootstocks.
  - Foliage green, not canescent nor scurfy.
    - Stems leafless or nearly so .... 2. *C. runcinata.*
    - Stems leafy; cauline leaves clasping .... 3. *C. virens.*
  - Foliage mostly white-pubescent, scurfy.
    - Plants 10 to 30 cm. high; involucre with 9 to 24 principal bracts.
      - Involucre glandular-hirsute .... 4 *C. occidentalis.*
      - Involucre hirsute, not glandular.
        - Akenes beaked; pubescence hirsute .... 5. *C. rostrata.*
        - Akenes not beaked; pubescence tomentose .... 6. *C. glareosa.*
    - Plants 40 to 60 cm. high; involucre with 5 to 10 principal bracts.
      - Involucre bearing bristle-like appendages on the back .... 9. *C. barbigera.*
      - Involucre without bristle-like appendages.
        - Bracts of the involucre glabrous .... 7. *C. acuminata.*
        - Bracts of the involucre canescent .... 8. *C. gracilis.*

1. **Crepis nana** Richards. Bot. App. Frankl. Journ. ed. 2. 757. 1823.
Type locality: "On the Copper Mine River."
Range: Arctic regions, south to California and Colorado.
Specimens examined: Olympic Mountains, *Flett* 810; Mount Adams, *Suksdorf* in 1904.
Zonal distribution: Arctic.

2. **Crepis runcinata** (James) Torr. & Gr. Fl. **2**: 487. 1843.
Hieracium runcinatum James, Long Exped. **1**: 453. 1823.
Crepidium runcinatum Nutt. Trans. Am. Phil. Soc. **7**: 436. 1841.
Type locality: "In depressed grassy situations along the Platte."
Range: Washington to Saskatchewan, south to Utah and Colorado.
Specimens examined: Ellensberg, *Piper* 2665; *Whited* 695; Toppenish, *Henderson*, May 28, 1892; Wilbur, *Henderson*, in 1889, July 12, 1892; without locality, *Vasey;* Sprague, *Sandberg & Leiberg* 208; Kittitas Valley, *Cotton* 1217.
Zonal distribution: Arid Transition.

3. **Crepis virens** L. Sp. Pl. ed. 2. **2**: 1134. 1763.
Malacothrix crepoides A. Gray, Pac. R. Rep. **12**^{2}: 49. 1860.
Crepis cooperi A. Gray, Proc. Am. Acad. **9**: 214. 1874.
Type locality: "Habitat in Helvetiae, Italiae agris."
Specimens examined: Olympia, *Kincaid*, July 4, 1896; Seattle, *Piper*, July 10, 1895; *Suksdorf* 1640; Clarke County, *Suksdorf* 29; Tacoma, *Piper*.

4. Crepis occidentalis Nutt. Journ. Acad. Phila. 7: 29. 1834.

Psilachenia occidentalis Nutt. Trans. Am. Phil. Soc. 7: 437. 1841.

Type locality: "Columbia River." Collected by Wyeth.

Range: British Columbia and Montana to California and Arizona.

Specimens examined: Olympic Mountains, *Flett*, August, 1888; near Lyle, *Suksdorf* 875; near Cleveland, *Suksdorf* 381; Wenache, *Whited* 1087, 1350; "on the borders and in in the vicinity of the river Columbia," *Wyeth;* Wawawai, *Piper* 1784; *Elmer* 747; Blue Mountains, *Piper* 2438; Wenas, *Griffiths & Cotton* 72.

Zonal distribution: Upper Sonoran and Arid Transition.

5. Crepis rostrata Coville, Contr. Nat. Herb. 3: 564. 1896.

Type locality: "Near Crab Creek, Douglas County, Washington." Collected by Sandberg & Leiberg.

Range: British Columbia and eastern Washington.

Specimens examined: North Yakima, *Mrs. Steinweg* in 1894; Cleman Mountain, *Henderson*, June 11, 1892; Klickitat County, *Howell* 1879; between Naches and Wenache rivers, *Pickering & Brackenridge* in 1841; Coulee City, *Piper* 3866; near Crab Creek, *Sandberg & Leiberg* 225.

Zonal distribution: Upper Sonoran.

6. Crepis glareosa Piper, Bull. Torr. Club 28: 42. 1901.

Type locality: Ellensburg, Washington.

Specimens examined: Ellensburg, Piper 2704 (type).

7. Crepis acuminata Nutt. Trans. Am. Phil. Soc. 7: 437. 1841.

Type locality: "Plains of the Platte." Collected by Nuttall.

Range: Washington and Montana to California and Utah.

Specimens examined: Ellensburg, *Elmer* 383; Crab and Wilson creeks, *Sandberg & Leiberg* 232.

8. Crepis gracilis (D. C. Eaton) Rydberg, Mem. N. Y. Bot. Gard. 1: 461. 1900.

Crepis occidentalis gracilis D. C. Eaton; S. Wats. Bot. King Explor. 203. 1871.

Crepis intermedia A. Gray, Syn. Fl. 1^2: 432. 1884.

Type locality: Middle Park, Colorado.

Range: British Columbia to California and Colorado.

Specimens examined: Wenache, *Whited* 1112; Ellensburg, *Whited* 455; Toppenish, *Henderson* in 1892; Wenas, *Lyall* in 1860; Naches Valley, *Piper* 2737; without locality, *Vasey* 571, 572, 573; Spokane County, *Suksdorf* 379; Douglas County, *Spillman;* Colton, *Piper* 2883; Wawawai, *Elmer* 1401, 761; Almota, *Piper;* without locality, *Wilkes Expedition;* Waitsburg, *Horner* 167; Conconully, *Griffiths & Cotton* 269.

Zonal distribution: Arid Transition and Upper Sonoran.

9. Crepis barbigera Leiberg, Contr. Nat. Herb. 3: 565. 1896.

Type locality: "Near Alkali Lake, Douglas County, Washington." Collected by Sandberg & Leiberg.

Range: Eastern Washington and eastern Oregon.

Specimens examined: Mountains north Ellensburg, *Whited* 659; Ellensburg, *Elmer* 392; *Piper;* Wenache, *Whited* 155, 1183; Wenache Mountains, *Whited* 1183; Klickitat County, *Suksdorf* 777 in part; near Alkali Lake, *Sandberg & Leiberg* 313; Spokane Prairie, *Suksdorf* 378; *Piper* 2264, 2637; Spangle, *Piper* 2874.

Zonal distribution: Arid Transition.

HIERACIUM. Hawkweed.

Stems many-leaved; involucre imbricated.

Lower part of stem pilose.................................... 1. *H. columbianum.*
Lower part of stem glabrous.................................. 2. *H. canadense.*

Stems few-leaved; involucre a series of equal bracts and a few short calyculate ones.
Flowers white; involucre nearly glabrous...................... 3. *H. albiflorum.*
Flowers yellow.
Heads small, black-hairy................................. 4. *H. gracile.*
Heads larger; not black-hairy.
Involucre densely long-hairy.
Cauline leaves ample, half-clasping at the broad bases.. 5. *H. longiberbe.*
Cauline leaves much reduced.................... 6. *H. scouleri.*
Involucre with few or no long hairs.
Leaves densely hirsute.......................... 7. *H. griseum.*
Leaves nearly smooth........................... 8. *H. cynoglossoides.*

1. **Hieracium columbianum** Rydberg, Bull. Torr. Club **28**:513. 1901.
Type locality: "Priest River Valley," Idaho.
Range: North Idaho and adjacent Washington.
Specimens examined: Dartford, *Kreager*, September 12, 1903; Loon Lake, *Winston*, July 20, 1897; Spokane County, *Suksdorf* 935; Peshastin, *Sandberg & Leiberg* 510.
Zonal distribution: Arid Transition.

2. **Hieracium canadense** Michx. Fl. **2**: 86. 1803.
Type locality: "Hab. in Canada."
Range: British Columbia to Nova Scotia, south to Oregon and New Jersey.
Specimens examined: Loomis *Elmer* 570; Pullman *Piper*, August 5, 1893; *Elmer* 307; Spokane *Piper*, July 26, 1896; Coupeville *Gardner* 422.
Zonal distribution: Arid Transition.

3. **Hieracium albiflorum** Hook. Fl. Bor. Am. **1**: 298. 1833.
? *Hieracium vancouverianum* Arvet-Touv. Spicil. Hier. 10. 1874.
Type locality: "Rocky Mountains north of Smoking River, Lat. 56°." Collected by Drummond.
Range: British Columbia and Alberta to California and Colorado.
Specimens examined: Montesano, *Heller* 3918; Grays Harbor, *Wilkes Expedition;* Cascade Mountains, latitude 49°, *Lyall* in 1859; Silverton, *Bouck* 113; Seattle, *Piper* 502; Mount Rainier, *Piper*, August, 1895; upper Nisqually Valley, *Allen* 11; Skagit Pass, *Lake & Hull*, August 24, 1892; Colville, *Lyall* in 1860; Falcon Valley, *Suksdorf* 427; Nason Creek, *Sandberg & Leiberg* 611; Conconully, *Whited* 1323; Bridge Creek, *Elmer* 688, in 1897; Tukanon River, *Lake* 742; Mount Carlton, *Kreager* 303; Lake Kalispel, *Kreager* 347.
Zonal distribution: Transition and Canadian.

4. **Hieracium gracile** Hook. Fl. Bor. Am. **1**: 298. 1833.
Hieracium triste gracile A. Gray, Bot. Cal. **1**: 441. 1876.
Hieracium hookeri Steud. Nom. ed. 2. **1**:763. 1840.
Hieracium arcticum Froel.; DC. Prod. **7**: 209. 1838.
Type locality: Rocky Mountains. Collected by Drummond.
Range: Alaska to Oregon and Colorado.
Specimens examined: Cascade Mountains, latitude 49°, *Lyall* in 1859; Silverton, *Bouck* 116; Mount Rainier, *Piper* 2155; *Allen* 286; Mount Adams, *Suksdorf* 428; *Flett* 1082, 1398; Stevens Pass, *Sandberg & Leiberg* 716; Skagit Pass, *Lake & Hull*, August 24, 1892; Yakima County, *Henderson*, August 5, 1892; Wenache Mountains, *Elmer* 449; Horseshoe Basin, *Elmer* 726; Blue Mountains, *Piper*, July, 1896.
Zonal distribution: Arctic.

5. **Hieracium longiberbe** Howell, Fl. N. W. Am. 395. 1901.
Type locality: "On cliffs along the Columbia river near the Cascades."
Range: Oregon and Washington on cliffs in the Columbia Gap.

SPECIMENS EXAMINED: Cape Horn, *Piper* 5011; Chenowith, *Suksdorf* 2133.
ZONAL DISTRIBUTION: Humid Transition.

6. **Hieracium scouleri** Hook. Fl. Bor. Am. **1**: 298. 1834.
TYPE LOCALITY: "Mouth of the Columbia." Collected by Scouler.
RANGE: British Columbia to Montana and Utah.
SPECIMENS EXAMINED: Nason Creek, *Sandberg & Leiberg* 671; Colville, *Lyall* in 1860; Spokane County, *C. A. Ramm*, July, 1883; *Suksdorf* 385; Mount Carlton, *Kreager* 244; along the Tukanon River, *Lake & Hull*, July 4, 1892; Pullman, *Piper* 1614; Bishop's Bar, Snake River, *Piper* 2885.
ZONAL DISTRIBUTION: Transition.

The relations of this and the two following need careful field study. The differences are wholly of pubescence, and inasmuch as the different types frequently occur growing together, the character may be only of formal value.

7. **Hieracium griseum** Rydberg, Mem. N. Y. Bot. Gard. **1**: 465. 1900.
TYPE LOCALITY: Jack Creek, Montana.
RANGE: Washington to Montana.
SPECIMENS EXAMINED: Mount Adams, *Suksdorf;* Lake Park, *Piper* 2160 in part; between Olympia and Gate City, *Heller* 4053; mouth of Columbia, *Scouler;* Wenache Mountains, *Whited* 1187 in part; *Cotton* 1744; Chelan, *Whited* 214; Lake Chelan, *Lake & Hull* 741; Chelan, *Elmer* 496.
ZONAL DISTRIBUTION: Transition.

8. **Hieracium cynoglossoides** Arvet-Touv. Spicil. Hier. 20. 1881.
Hieracium amplum Greene, Erythea **3**: 101. 1895.
TYPE LOCALITY: "North Western Wyoming."
RANGE: British Columbia to Wyoming and Oregon.
SPECIMENS EXAMINED: Whidby Island, *Gardner* 117; Mount Adams, *Suksdorf* 2255; Lake Park, *Piper* 2160 in part; Falcon Valley, *Suksdorf* 426; Klickitat River, *Flett* 1085, 1077; Peshastin, *Sandberg & Leiberg* 526; Fish Lake, *Dunn*, August 8, 1902; Wenache Mountains, *Whited* 1187 in part; Tieton River, *Cotton* 440; Loon Lake, *Winston*, July 20, 1897; without locality, *Vasey* 561, 562; Elma, *Heller* 4063; Loomis, *Elmer* 550.
ZONAL DISTRIBUTION: Transition.

NABALUS.

1. **Nabalus hastata** (Less.) Heller, Muhlenbergia **1**: 8. 1900.
Sonchus hastatus Less. Linnaea **6**: 99. 1831.
Nabalus alatus Hook. Fl. Bor. Am. **1**: 294. 1833.
Prenanthes alata A. Gray, Syn. Fl. 1^2: 435. 1884.
TYPE LOCALITY: "In Unalaschka."
RANGE: Alaska to Oregon and Idaho.
SPECIMENS EXAMINED: Cascades, latitude 49°, *Lyall* in 1859; Olympic Mountains, *Piper* in 1890; Snoqualmie Falls, *Piper*, September, 1902; Monte Cristo, *Misses Coffin & Goodspeed;* Wind River, *Flett* 1084; Stevens Pass, *Whited* 1461; Snoqualmie Pass, *Piper;* without locality, *Vasey* 558; mouth of Queets River, *Conard* 325.
ZONAL DISTRIBUTION: Canadian and Hudsonian.

LACTUCA.

Pappus brown; flowers whitish.................................... 1. *L. spicata.*
Pappus white.
  Flowers yellow; leaves spiny.................................... 2. *L. scariola.*
  Flowers blue; leaves not spiny.................................... 3. *L. pulchella.*

1. **Lactuca spicata** (Lam.) A. S. Hitchcock, Trans. Acad. St. Louis **5**: 506. 1891.
Sonchus spicatus Lam. Encyc. **3**: 401. 1789.
Sonchus leucophaeus Willd. Sp. Pl. **3**:1520. 1803.
Mulgedium leucophaeum DC. Prod. **7**: 250. 1838.
Lactuca leucophaea A. Gray, Proc. Am. Acad. **19**: 73. 1883.
TYPE LOCALITY: "Carolina."
RANGE: British Columbia to Newfoundland, south to Oregon and Carolina.
SPECIMENS EXAMINED: Cascade Mountains, latitude 49°, *Lyall* in 1859; Seattle, *Piper;* Nisqually Valley, *Allen* 126a; Falcon Valley, *Suksdorf* 429; Nason Creek, *Sandberg & Leiberg* 615; Waitsburg, *Horner* 11.
ZONAL DISTRIBUTION: Transition.

2. **Lactuca scariola integrata** Gren. & Godr. Fl. Fr. **2**: 320. 1850.
PRICKLY LETTUCE.
TYPE LOCALITY: France.
SPECIMENS EXAMINED: Rock Island, *Sandberg & Leiberg* 467; North Yakima, *Watt*, August, 1895; Pullman, *Piper*, August 15, 1894; Wawawai, *Piper*, 1615; Spokane, *Kreager* 580.

3. **Lactuca pulchella** (Pursh) DC. Prod. **7**: 134. 1838. BLUE LETTUCE.
Sonchus pulchellus Pursh, Fl. **2**: 502. 1814.
TYPE LOCALITY: "On the banks of the Missouri."
RANGE: British Columbia to Saskatchewan, south to California and New Mexico.
SPECIMENS EXAMINED: Ellensburg, *Whited* 567; North Yakima, *Watt*, August, 1895; Beaver Creek, *Whited* 30; Fort Vancouver, *Tolmie;* Cascade Mountains to Colville, *Lyall* in 1860; Cow Creek, *Lyall* in 1860; Lake Chelan, *Lake & Hull*, August 4, 1892; Egbert Springs, *Sandberg & Leiberg* 422; Coulee City, *Lake & Hull*, August 7, 1892; Wilson Creek, *Lake & Hull* 808; Wawawai, *Elmer* 895; Box Canyon, *Kreager* 390; without locality, *Vasey* 570.
ZONAL DISTRIBUTION: Arid Transition.

SONCHUS. SOW THISTLE.

Heads large, involucre glandular-pubescent.............................. 1. *S. arvensis.*
Heads medium-sized; involucre glabrous.
  Leaves prickly-toothed; auricles rounded.......................... 2. *S. asper.*
  Leaves with soft teeth; auricles acute.............................. 3. *S. oleraceus.*

1. **Sonchus arvensis** L. Sp. Pl. **2**: 793. 1753.
TYPE LOCALITY: European.
SPECIMENS EXAMINED: Whidby Island, *Gardner* 150; mouth of Naches River, *Piper* 2666.

2. **Sonchus asper** (L.) Hill, Herb. Brit. **1**: 47. 1769.
Sonchus oleraceus asper L. Sp. Pl. **2**: 794. 1753.
TYPE LOCALITY: European.
SPECIMENS EXAMINED: North Yakima, *Watt*, August, 1895; Tukanon River, *Lake*, July 2, 1892; Pullman, *Hull* 807.

3. **Sonchus oleraceus** L. Sp. Pl. **2**: 794. 1753.
TYPE LOCALITY: European.
SPECIMENS EXAMINED: Seattle, *Piper*, July 10, 1895.

AMBROSIACEAE. Ragweed Family.

Heads with both staminate and pistillate flowers; involucre open .... Iva.
Heads unisexual; pistillate heads usually spiny.
Bracts of staminate heads separate; pistillate heads forming an oblong bur.. Xanthium.
Bracts of staminate heads united.
Pistillate flowers solitary in each head; spines in a single series ... Ambrosia.
Pistillate flowers 1 to 4 in each head; spines in several series ..... Gaertneria.

IVA.

Heads in dense panicles; leaves ovate or orbicular, coarsely serrate...... 1. *I. xanthiifolia.*
Heads in axillary racemes; leaves oblong or obovate, mostly entire.... 2. *I. axillaris.*

1. Iva xanthiifolia Nutt. Gen. **2**: 185. 1814.
Iva paniculata Nutt. Trans. Am. Phil. Soc. **7**: 347. 1840.
Type locality: "Near Fort Mandan," North Dakota.
Range: Washington to Saskatchewan, south to Utah and New Mexico.
Specimens examined: West Klickitat County, *Suksdorf* 355; Leavenworth, *Whited* 1447; Pullman, *Piper* 1381; Spokane, *Kreager* 532.
Zonal distribution: Arid Transition.

2. Iva axillaris Pursh, Fl. **2**: 743. 1814.
Type locality: "In upper Louisiana." Collected by Bradbury.
Range: British Columbia to Saskatchewan, south to California and New Mexico.
Specimens examined: Wenache, *Whited* 1133; Morgans Ferry, *Suksdorf* 450; Washtucna, *Elmer* 1038; Coulee City, *Henderson*, July 11, 1892; *Lake & Hull*, August 7, 1897; Wilson Creek, *Lake & Hull* 739; Junction, Crab, and Wilson creeks, *Sandberg & Leiberg* 318.
Zonal distribution: Upper Sonoran.

XANTHIUM. Cocklebur.

Leaves lanceolate, not cordate, bright green above, white-tomentose beneath, the axils bearing spines.............................. 1. *X. spinosum.*
Leaves ovate to orbicular, cordate; axils without spines.
Body of the burs 2.5 to 3 cm. long; spines about 100, hispid, strongly hooked.. 2. *X. speciosum.*
Body of the burs 1.5 to 2 cm. long.
Spines about 20, approximately as long as the body of the narrowly oblong bur.............................. 3. *X. oligacanthum.*
Spines 50 to 70.
Burs oblong or slightly ovate; spines about 50, each two-thirds as long as the diameter...................... 4. *X. affine.*
Burs ovate; spines about 70, each one-half as long as the diameter.................................. 5. *X. varians.*

1. Xanthium spinosum L. Sp. Pl. **2**: 987. 1753.
Type locality: "Habitat in Lusitania."
Specimens examined: Columbia River, *Brandegee* 889, Colfax, *Piper* 1591.
Becoming common as a weed in various parts of eastern Washington; locally known as "Chinese Thistle."

2. Xanthium speciosum Kearney, Bull. Torr. Club **24**: 574. 1897.
Xanthium silphiifolium Greene, Pittonia **4**: 60. 1899.
Type locality: "Near Wolf Creek Station," Tennessee.

RANGE: Washington, Oregon, Missouri, Tennessee.

SPECIMENS EXAMINED: White Salmon, *Suksdorf* 189; Wawawai, *Piper* 1593.

ZONAL DISTRIBUTION: Humid Transition.

3. **Xanthium oligacanthum** sp. nov.

Stem erect or spreading, 30 to 60 cm. high, sparsely hispid; leaves reniform-orbicular, obscurely lobed and crenate, harshly scabrous, hispid on both faces, the petioles as long or longer than the blades; fruiting involucres oblong, the body 1.5 cm. long, 5 to 7 mm. thick, the stout beaks somewhat incurved; prickles 15 to 25, uncinate-tipped, about as long as the diameter of the fruit; surface of the fruit and base of prickles pubescent.

Bolles, Walla Walla County, *Piper*, September 18, 1893; also found at Waitsburg by *Horner* (no. B 272). The type is in the National Herbarium. This differs from any other American species in the small size of the fruit and the relatively few prickles.

4. **Xanthium affine** Greene, Pittonia 4: 60. 1899.

TYPE LOCALITY: "Sandy banks of the Columbia River, Klickitat County, Washington." Collected by Suksdorf.

RANGE: Washington.

SPECIMENS EXAMINED: West Klickitat County, *Suksdorf* 1583; Spokane, *Kreager* 537; *Piper* September 1, 1899.

5. **Xanthium varians** Greene, Pittonia 4: 59. 1899.

TYPE LOCALITY: "Sandy banks of the Columbia River, Klickitat County, Washington." Collected by Suksdorf.

RANGE: Washington.

SPECIMENS EXAMINED: West Klickitat County, *Suksdorf* 1583; Waitsburg, *Horner* 273 B.

XANTHIUM ECHINATUM Murr. and XANTHIUM STRUMARIUM L. are names which appear in Suksdorf's list, but they are erroneous determinations of some of the above species.

AMBROSIA. RAGWEED.

Leaves all opposite; receptacle without chaff .... 1. *A. trifida*.
Leaves opposite and alternate; receptacle chaffy.
    Fruiting involucre spiny; leaves thin .... 2. *A. artemisiaefolia*.
    Fruiting involucre tubercled; leaves thick .... 3. *A. psilostachya*.

1. **Ambrosia trifida** L. Sp. Pl. 2: 987. 1753.

TYPE LOCALITY: "In Virginia, Canada."

RANGE: Saskatchewan and Canada to Texas and Florida.

SPECIMENS EXAMINED: Walla Walla, *Piper*, August 13, 1897 (introduced).

2. **Ambrosia artemisiaefolia** L. Sp. Pl. 2: 988. 1753.

TYPE LOCALITY: "Habitat in Virginia; Pennsylvania."

RANGE: British Columbia to Nova Scotia, south to Texas.

SPECIMENS EXAMINED: Mission, *Kreager* 495.

2a. **Ambrosia artemisiaefolia diversifolia** subsp. nov.

Leaves becoming progressively less deeply lobed upward, those of the upper third of the plant mostly entire, these ovate-lanceolate or lanceolate, acute, narrowed abruptly to a subsessile base, 3-nerved.

On the gravelly banks of Almota Creek at Almota, *Piper*, August 26, 1894 (no. 1837). At this place it seems unquestionably to be native. The entire or subentire upper leaves present a peculiar characteristic which does not seem to be approached in any eastern specimens. The plant may represent a distinct species, but in the absence of more abundant material it seems best to treat it as above.

The type is in the National Herbarium.

3. **Ambrosia psilostachya** DC. Prod. 5: 526. 1836.

TYPE LOCALITY: "In Mexico, inter San Fernando et Matamoras."

RANGE: Washington to Saskatchewan, south to California and Texas.

SPECIMENS EXAMINED: Walla Walla, *Piper*, August 13, 1897; Pullman, *Piper*, October 10, 1897.

Apparently an introduced plant in Washington.

GAERTNERIA.

Not maritime; annual, erect or spreading.......................... 3. *G. acanthicarpa*.
Maritime species; prostrate perennials.
    Leaves 2 to 3 pinnately parted.......................... 1. *G. bipinnatifida*
    Leaves cuneate-obovate, serrate or laciniate.......................... 2. *G. chamissonis*.

1. **Gaertneria bipinnatifida** (Nutt.) Kuntze, Rev. Gen. 1: 339. 1891.

Franseria bipinnatifida Nutt. Trans. Am. Phil. Soc. 7: 344. 1840.

TYPE LOCALITY: "Sea coast of Upper California, (St. Barbara, St. Diego, &c.)"

RANGE: Seacoast, Washington to California.

SPECIMENS EXAMINED: Ilwaco, *Henderson*, September 7, 1892; Shoalwater Bay, *Cooper*; Puget Sound, *Henderson* 21; Port Angeles, *Piper* 2307; Fairhaven, *Piper*, July 2, 1897; Whatcom County, *Suksdorf* 976; Seattle, *Piper*, September, 1898; Tacoma, *Flett* 101.

ZONAL DISTRIBUTION: Humid Transition.

2. **Gaertneria chamissonis** (Less.) Kuntze, Rev. Gen. 1: 339. 1891.

Franseria chamissonis Less.; DC. Prod. 5: 524. 1836.

Franseria cuneifolia Nutt. Trans. Am. Phil. Soc. 7: 507. 1840.

TYPE LOCALITY: California.

RANGE: Seacoasts, Washington to California.

SPECIMENS EXAMINED: Shoalwater Bay, *Cooper* in 1854.

ZONAL DISTRIBUTION: Humid Transition.

3. **Gaertneria acanthicarpa** (Hook.) Britton, Mem. Torr. Club 5: 382. 1894.

Ambrosia acanthicarpa Hook. Fl. Bor. Am. 1: 309. 1833.

Franseria hookeriana Nutt. Trans. Am. Phil. Soc. 7: 345. 1840.

Franseria acanthicarpa Coville, Contr. Nat. Herb. 4: 129. 1893.

TYPE LOCALITY: "Banks of the Saskatchewan and Red Rivers."

RANGE: Washington to Saskatchewan, south to Arizona and Texas.

SPECIMENS EXAMINED: West Klickitat County, *Suksdorf*, September, 1883; Fishhook Ferry, *Leiberg* 922; banks of Columbia River, Wenache, *Whited* 28; North Yakima, *Watt*, August, 1895; bluffs of the Columbia above Chelan River, *Watson* 211; Almota, *Piper* 1830, 1837; Prosser, *Cotton* 630; Sunnyside, *Cotton* 755; Priest Rapids, *Cotton* 1390.

ZONAL DISTRIBUTION: Upper Sonoran.

ASTERACEAE. ASTER FAMILY.

SYNOPSIS OF THE TRIBES.

Anthers not caudate at base; style branches either truncate or tipped with an appendage.
    Heads rayless; style branches club-shaped, obtuse; flowers all perfect, never yellow.......................... EUPATORIEAE.
    Heads radiate (rarely rayless).
        Style branches of perfect flowers flat, or tipped with a distinct appendage; leaves mostly alternate.......................... ASTEREAE.
        Style branches of perfect flowers truncate or appendaged, not flattened; leaves often opposite.
            Involucre not scarious.

Pappus never capillary.
Receptacle chaffy.................................. HELIANTHEAE.
Receptacle not chaffy.............................. HELENIEAE.
Pappus capillary....................................... SENECIONEAE.
Involucre scarious, pappus not capillary..................... ANTHEMIDEAE.
Anthers caudate at base; style-branches neither truncate nor appendaged; heads not radiate.
Receptacle not bristly; corollas not deeply cleft....................... INULEAE.
Receptacle long bristly; corollas deeply cleft.......................... CYNAREAE.

EUPATORIEAE.

Akenes 5-angled .... EUPATORIUM (p. 555).
Akenes 10-ribbed .... COLEOSANTHUS (p. 556).

ASTEREAE.

Pappus of 2 to 8 rigid awns; heads large, gummy........... GRINDELIA (p. 556).
Pappus of numerous capillary bristles.
Rays yellow (sometimes wanting).
Pappus double, the outer very short............... CHRYSOPSIS (p. 557).
Pappus simple.
Heads rayless, small, clustered .... CHRYSOTHAMNUS (p. 558).
Heads radiate or if rayless, large.
Pappus bristles unequal; heads mostly few and large.
Style branches setaceous-tipped ..... ERICAMERIA (p. 559).
Style branches not setaceous-tipped .. HOOREBEKIA (p. 559).
Pappus bristles equal; heads small, clustered.
Panicle thyrsoid; receptacle alveolate.. SOLIDAGO (p. 561).
Panicle flat-topped; receptacle fimbrillate............................ EUTHAMIA (p. 563).
Rays white, purple, or blue (yellow in a few Erigerons), rarely wanting.
Pappus a single series of coarse, rigid bristles....... TOWNSENDIA (p. 563).
Pappus of numerous soft bristles.
Bracts of the involucre in many series, their tips spreading............................. MACHAERANTHERA (p. 575).
Bracts of the involucre in few (1 to 5) series, their tips mostly erect.
Involucral bracts in one or two series, narrow; rays usually narrow and numerous . ERIGERON (p. 563).
Involucral bracts in two to five series; rays broader, less numerous.
Involucre narrow, with rigid bracts; rays white, few .... SERICOCARPUS (p. 569).
Involucre turbinate or hemispheric.
Stems scape-like .... OREASTRUM (p. 569).
Stems leafy.
Scales of the involucre dry and chartaceous, closely appressed................. EUCEPHALUS (p. 569).
Scales of the involucre more or less herbaceous and spreading................ ASTER (p. 570).

HELIANTHEAE.

Involucral scales boat-shaped, each more or less inclosing a ray akene.
Akenes all laterally compressed........................ Madia (p. 575).
Akenes not laterally compressed.
Ray akenes turgid, or somewhat obcompressed.
Involucre 4 or 5-sulcate; disk flower solitary ... Hemizonella (p. 577).
Involucre not sulcate; disk flowers several...... Hemizonia (p. 577).
Ray akenes obcompressed.
Rays about 5; pappus none.................. Lagophylla (p. 577).
Rays 8 to 13; pappus capillary................ Blepharipappus (p. 578).
Involucral scales not inclosing the outer akenes.
Pappus present, of well-developed scales or awns.
Scales of the pappus 12 to 20, thin, fringed......... Ptilonella (p. 578).
Scales of the pappus awn-like.
Awn-like scales 2 or 4, retrorsely barbed....... Bidens (p. 578).
Awn-like scales 2, subulate.................... Coreopsis (p. 579).
Pappus wanting, or crown-like, or of short teeth.
Receptacle elongate-cylindric...................... Rudbeckia (p. 579).
Receptacle flat or convex.
Rays pistillate and fertile.
Pappus none............................ Balsamorhiza (p. 580).
Pappus a toothed crown.................. Wyethia (p. 581).
Rays neutral.
Akenes flat and thin...................... Helianthella (p. 582).
Akenes prismatic......................... Helianthus (p. 582).

HELENIEAE.

Bracts of the involucre in two series; receptacle naked; pappus none... Jaumea (p. 582).
Bracts of the involucre in one series.
Akenes linear, 4-angled.
Bracts of the involucre united...................... Eriophyllum (p. 583).
Bracts of the involucre separate, linear.
Heads radiate.
Pappus scales thin, blunt; viscid perennial. Hulsea (p. 583).
Pappus scales awn-like; annual .... Rigiopappus (p. 583).
Heads rayless, but marginal flowers enlarged; pappus scales blunt, hyaline................. Chaenactis (p. 583).
Akenes obpyramidal.
Receptacle bristly .... Gaillardia (p. 584).
Receptacle naked.
Akenes 4-5 angled; pappus scales 10 to 20 ..... Hymenopappus (p. 584).
Akenes 8-10 ribbed; pappus scales 5 or 6....... Helenium (p. 584).

ANTHEMIDEAE.

Ray flowers present.
Receptacle chaffy.
Involucre narrow; rays short .... Achillea (p. 584).
Involucre broad; rays conspicuous................. Anthemis (p. 585).
Receptacle naked .... Chrysanthemum (p. 585).
Ray flowers none.
Receptacle conical .... Matricaria (p. 585).

Receptacle not conical.
Heads slender-peduncled; pistillate flowers apetalous.... COTULA (p. 586).
Heads clustered; corollas present.
Pappus a short crown; heads corymbed .... TANACETUM (p. 586).
Pappus none; heads racemose or panicled .... ARTEMISIA (p. 586).

SENECIONEAE.

Shrub; involucre of 4 to 6 concave bracts........................ TETRADYMIA (p. 590).
Herbs.
Leaves all or mostly opposite................................ ARNICA (p. 590)
Leaves alternate.
Flowers whitish or pinkish; heads rayless.
Leaves large, palmately lobed, mostly basal.
Styles united nearly to the apex .... PETASITES (p 593).
Styles united about half way .... CACALIOPSIS (p. 594).
Leaves entire; stems leafy.
Heads about 10-flowered, corymbed............. LUINA (p. 594).
Heads 4 to 6-flowered, paniculate............... RAINIERA (p. 594).
Flowers yellow; rays present (except in a few species of Senecio).
Involucre hemispheric; heads solitary................ CROCIDIUM (p. 594).
Involucre campanulate; heads usually corymbose.... SENECIO (p. 595).

INULEAE.

Pappus capillary, at least in pistillate flowers.
Plants dioecious or polygamo-dioecious.
Pappus of staminate flowers clavate...................... ANTENNARIA (p. 601).
Pappus of all the flowers similar....................... ANAPHALIS (p. 606).
Plants not dioecious; flowers all fertile...................... GNAPHALIUM (p. 606).
Pappus none.
Receptacle naked; leaves large, green above................ ADENOCAULON (p. 607).
Receptacle chaffy; leaves small, woolly..................... PSILOCARPHUS (p. 607).

CYNAREAE.

Akenes obliquely attached by one side at base.
Heads not subtended by bristly leaves .... CENTAUREA (p. 608).
Heads sessile, subtended by bristly leaves................... CNICUS (p. 608).
Akenes attached by the very base, not oblique.
Filaments monadelphous below .... SILYBUM (p. 609).
Filaments distinct.
Leaves and usually the involucral bracts prickly.......... CARDUUS (p. 609).
Leaves not prickly.
Heads globose, the bracts hook-tipped.............. ARCTIUM (p. 611).
Heads oblong, the bracts unarmed................. SAUSSUREA (p. 611).

EUPATORIUM.

1. **Eupatorium occidentale** Hook. Fl. Bor. Am. **1**: 305. 1833.

Krystenia occidentalis Greene, Leaflets **1**: 9. 1903.

TYPE LOCALITY: "On the low hills between the north and south branch of Lewis and Clarks River in stony places." Collected by Douglas.

RANGE: Washington and Idaho to California.

SPECIMENS EXAMINED: West Klickitat County, *Suksdorf* 865; Ellensburg, *Elmer* 423 1084; Klickitat River, *Suksdorf*, July 16, 1886.

COLEOSANTHUS.

Leaves cordate-triangular, coarsely toothed.......................... 1. *C. grandiflorus.*
Leaves oblong or lanceolate, entire.
Akenes glandular.. 2. *C. oblongifolius.*
Akenes hispid, not glandular.................................. 3. *C. linifolius.*

1. Coleosanthus grandiflorus (Nutt.) Kuntze, Rev. Gen. Pl. **1**: 328. 1891.

Brickellia grandiflora Nutt. Trans. Am. Phil. Soc. **7**: 287. 1840.

TYPE LOCALITY: "In the Rocky Mountain range by streams in gravelly places, and west to the lower falls of the Columbia." Collected by Nuttall.

RANGE: Washington and Montana to New Mexico and Arizona.

SPECIMENS EXAMINED: Spokane, *Piper* 2381 ; *Kreager* 542, 547; Spokane Falls, *Geyer* 452; Blue Mountains, Salmon River, *Horner* 351.

ZONAL DISTRIBUTION: Arid Transition.

2. Coleosanthus oblongifolius (Nutt.) Kuntze, Rev. Gen. Pl. **1**: 328. 1891.

Brickellia oblongifolia Nutt. Trans. Am. Phil. Soc. **7**: 288. 1840.

TYPE LOCALITY: "Gravel bars of the Columbia and tributary streams, and along the Wahlamet, common." Collected by Nuttall.

RANGE: British Columbia to Oregon.

SPECIMENS EXAMINED: Peshastin, *Sandberg & Leiberg* 491; Klickitat Prairie, *Howell:* without locality, *Vasey* in 1889; Rattlesnake Mountains, *Cotton* 710; Umtanum Creek, *Cotton* 819.

ZONAL DISTRIBUTION: Arid Transition.

3. Coleosanthus linifolius (Eaton) Kuntze, Rev. Gen. Pl. **1**: 328. 1891.

Brickellia linifolia Eaton in S. Wats. Bot. King. Explor. 137. *pl. 15.* 1871.

TYPE LOCALITY: "Sandy bottoms of American Fork, Jordan Valley, Utah."

RANGE: Washington to Utah and Arizona.

SPECIMENS EXAMINED: Ellensburg, *Elmer* 369; *Piper* 2745; *Whited* 690, 574; Egbert Springs, *Sandberg & Leiberg* 408; Yakima region, *Brandegee* 836; Spokane, *Henderson* 2277; *Piper;* bars of Touchet River, *Horner* 354; Spokane Bridge, *Sandberg, McDougal, & Heller* 911.

ZONAL DISTRIBUTION: Arid Transition and Upper Sonoran.

GRINDELIA.

Heads small, 6 to 8 mm. high; bracts squarrose.
Rays present.. 1. *G. nana.*
Rays wanting.. 1a. *G. nana columbiana.*
Heads larger; bracts not squarrose.
Cauline leaves broadest at base....................... 2. *G. integrifolia.*
Cauline leaves narrowest at base.
Stems suffrutescent................................... 3. *G. hendersoni.*
Stems herbaceous...................................... 4. *G. oregana.*

1. Grindelia nana Nutt. Trans. Am. Phil. Soc. **7**: 314. 1840.

TYPE LOCALITY: "Forests of Oregon, near Fort Vancouver, etc." Collected by Nuttall.

RANGE: Washington to Wyoming and California.

SPECIMENS EXAMINED: Fort Vancouver, *Nuttall;* Chelan, *Elmer* 498; Spangle, *Suksdorf* 333; Spokane, *Henderson*, July 9, 1892; Belmont, *Piper* 1833; St. Johns, *Lake & Hull* 754; Pullman, *Hardwick*, August 18, 1895; Waitsburg, *Horner* 566.

ZONAL DISTRIBUTION: Arid Transition.

1a. Grindelia nana columbiana nom. nov.

Grindelia discoidea Nutt. Trans. Am. Phil. Soc. **7**: 315. 1840, not Hook. & Arn. 1836.

Grindelia nana discoidea A. Gray, Syn. Fl. ed. 2. 1^2: 119. 1884.

TYPE LOCALITY: "On the banks of the Oregon." Collected by Nuttall.

RANGE: Oregon and Washington.

SPECIMENS EXAMINED: West Klickitat County, *Suksdorf* 189; White Bluff Ferry, *Lake & Hull* 753 and August 11, 1892; without locality, *Cooper;* Wenache, *Whited* 1151; Wilson Creek, *Lake & Hull* 753; Toppenish, *Cotton* 780.

ZONAL DISTRIBUTION: Arid Transition.

2. **Grindelia integrifolia** DC. Prod. 7: 315. 1836.

Grindelia virgata Nutt. Trans. Am. Phil. Soc. 7: 314. 1840.

TYPE LOCALITY: "N. W. America."

RANGE: Oregon and Washington.

SPECIMENS EXAMINED: Fort Vancouver, *Piper* 3805; *Tolmie.*

ZONAL DISTRIBUTION: Humid Transition.

3. **Grindelia hendersoni** Greene, Pittonia 2: 18. 1889.

TYPE LOCALITY: "Lummi Island," Washington. Collected by Henderson

RANGE: Known only from the type locality.

SPECIMENS EXAMINED: Lummi Island, *Henderson* 1676.

ZONAL DISTRIBUTION: Humid Transition.

This is perhaps only a perennating form of the following.

4. **Grindelia oregana** A. Gray, Syn. Fl. 1^2: 118. 1884.

TYPE LOCALITY: Oregon.

RANGE: British Columbia to Oregon along the coast.

SPECIMENS EXAMINED: Steilacoom, *Suckley;* Port Ludlow, *Binns,* September 15, 1890; 1890; Orcas Island, *Henderson* 2300; Fidalgo Island, *Lyall* in 1858; Oyhut, *Lamb* 1270; Rock Island, San Juan County, *Henderson* 2300; Tacoma, *Flett* 119; Seattle, *Piper* 2865; Union City, *Piper* in 1890; Stuart Island, *Lawrence* 38; Copalis *Conard* 387.

ZONAL DISTRIBUTION: Humid Transition.

GRINDELIA HIRSUTULA Hook. & Arn. is listed by Suksdorf, but we find no evidence of its belonging to our flora.

CHRYSOPSIS.

Rays none.. 1. *C. oregana.*
Rays present.
  Leaves canescent, strigose, or hirsute.......................... 2. *C. villosa.*
  Leaves green, hirsute and hispid............................... 3. *C. hispida.*

1. **Chrysopsis oregana** (Nutt.) A. Gray, Proc. Am. Acad. 6: 543. 1865.

Ammodia oregana Nutt. Trans. Am. Phil. Soc. 7: 32. 1840.

TYPE LOCALITY: "On the sand and gravel banks of the Oregon and its tributary streams." Collected by Nuttall.

RANGE: Washington to California.

SPECIMENS EXAMINED: Olympic Mountains, *Piper* 2194, 1063; Ellensburg, *Whited* 576, 689.

ZONAL DISTRIBUTION: Transition.

2. **Chrysopsis villosa** (Pursh) Nutt.; Hook. Fl. Bor. Am. 2: 22. 1834.

Amellus villosus Pursh, Fl. 2: 564. 1814.

Diplopappus villosus Hook. Fl. Bor. Am. 2: 22. 1834.

TYPE LOCALITY: "On the Missouri."

RANGE: British Columbia to Saskatchewan, south to California and Alabama.

SPECIMENS EXAMINED: Whidby Island, *Gardner* 153; Rock Island, *Sandberg & Leiberg* 451; North Yakima, *Watt,* August, 1895; Wenache, *Whited* 7; Ellensburg, *Whited* 575; near Colville, *Lyall* in 1860; Similkameen, *Lyall* in 1860; Wawawai, *Piper,* July 8, 1898; *Elmer* 1017; Illia, *Lake & Hull* 752; Box Canyon, *Kreager* 397; Meyers Falls, *Kreager* 516.

ZONAL DISTRIBUTION: Upper Sonoran, mainly.

3. Chrysopsis hispida (Hook.) Nutt.; DC. Prod. 7: 279. 1839.
Diplopappus hispidus Hook. Fl. Bor. Am. 2: 22. 1834.
Chrysopsis hirsuta Greene, Pittonia 3: 296. 1898.
Type locality: "Carlton-House Fort."
Range: Washington to Saskatchewan, south to Texas and Arizona.
Specimens examined: Loon Lake, *Winston*, July 20, 1897; Spokane, *Piper* 2385; Granddalles, *Cotton* 1550.
Zonal distribution: Arid Transition and Upper Sonoran.

CHRYSOTHAMNUS. Rabbit brush.

Bracts of the involucre attenuate, acute............................... 4. *C. bloomeri.*
Bracts of the involucre obtuse or obtusish.
Stems glabrous.
Heads few; plant 15 to 30 cm. high........................ 1. *C. pumilus.*
Heads numerous; plant .5 to 2 m. high.................... 2. *C. viscidiflorus.*
Stems more or less pubescent...................................... 3. *C. nauseosus.*

1. Chrysothamnus pumilus Nutt. Trans. Am. Phil. Soc. 7: 323. 1840.
Bigelovia douglasii pumila A. Gray, Syn. Fl. 1^2: 140. 1884.
Type locality: "On the border of Lewis River and the Rocky Mountain plains." Collected by Nuttall.
Range: Washington and Montana to Utah.
Specimens examined: Yakima region, *Brandegee* in 1882.

2. Chrysothamnus viscidiflorus (Hook.) Nutt. Trans. Am. Phil. Soc. 7: 324. 1840.
Crinitaria viscidiflora Hook. Fl. Bor. Am. 2: 24. 1834.
Bigelovia viscidiflora DC. Prod. 7: 279. 1838.
Bigelovia douglasii A. Gray, Proc. Am. Acad. 8: 645. 1873.
Type locality: "On the barren plains of the Columbia from the Great Falls to the mountains, and along Salmon River." Collected by Douglas.
Range: British Columbia to Dakota, south to California and New Mexico.
Specimens examined: Tampico, *Henderson*, July 31, 1892; Ellensburg, *Whited* 855; North Yakima, *Henderson*, October 5, 1892; Wenache, *Whited* 1328; Rattlesnake Mountains, *Cotton* 481; Egbert Springs, *Sandberg & Leiberg* 382; Chelan, *Elmer* 852; Coulee City, *Lake & Hull* 732; without locality *Vasey* 509; mouth of Snake River, *Cooper*.
Zonal distribution: Upper Sonoran.

2a. Chrysothamnus viscidiflorus lanceolatus (Nutt.) Greene, Erythea 3: 95. 1895.
Chrysothamnus lanceolatus Nutt. Trans. Am. Phil. Soc. 7: 324. 1840.
Bigelovia douglasii lanceolata A. Gray, Syn. Fl. 1^2: 140. 1884.
Type locality: "Toward the source of the Platte and on the banks of Lewis River." Collected by Nuttall.
Range: Washington to Montana and Wyoming.
Specimens examined: Tampico, *Flett* 1026.
Zonal distribution: Upper Sonoran.

3. Chrysothamnus nauseosus (Pall.) Britton in Britt. & Br. Ill. Fl. 3: 326. 1898.
Chrysocoma nauseosa Pall.; Pursh, Fl. 2: 517. 1814.
Chrysothamnus speciosus albicaulis Nutt. Trans. Am. Phil. Soc. 7: 324. 1840.
Bigelovia graveolens albicaulis A. Gray, Proc. Am. Acad. 8: 645. 1873.
Type locality: "On the banks of the Missouri."
Range: Washington to Alberta, south to California and Wyoming.
Specimens examined: Yakima Region, *Cooper;* Ellensburg, *Whited* 856; Umtanum Creek, *Cotton* 895; Prosser, *Cotton* 897; Blue Mountains, *Horner* 327; Wawawai, *Piper* 1571; Quillamene Creek, *Cotton* 1790.
Zonal distribution: Upper Sonoran.

3a. **Chrysothamnus nauseosus graveolens** (Nutt.).
Chrysocoma graveolens Nutt. Gen. **2**: 136. 1818.
Bigelovia gravolens A. Gray, Proc. Am. Acad. **8**: 645. 1873.
Chrysothamnus speciosus Nutt. Trans. Am. Phil. Soc. **7**: 323. 1840.

TYPE LOCALITY: "On the banks of the Missouri in denudated soils."

RANGE: British Columbia to Dakota, south to California and New Mexico.

SPECIMENS EXAMINED: North Yakima, *Henderson*, October 5, 1892; *Watt*, August, 1895; Wenache, *Whited* 1327; Rattlesnake Mountains, *Cotton* 481; White Bluffs, *Dunn*, September 13, 1902; Egbert Springs, *Sandberg & Leiberg* 344; Chelan, *Elmer* 851; Coulee City, *Lake & Hull* 733; Spokane, *Sandberg, McDougal, & Heller* 913.

ZONAL DISTRIBUTION: Upper Sonoran.

4. **Chrysothamnus bloomeri** Greene, Erythea **3**: 115. 1895.
Aplopappus bloomeri A. Gray, Proc. Am. Acad. **6**: 541. 1865.

TYPE LOCALITY: "Mount Davidson, Nevada."

RANGE: Washington to California and Nevada.

SPECIMENS EXAMINED: Mount Adams, *Suksdorf* 190; Yakima Region, *Brandegee* 843; Simcoe Mountains, *Howell* in 1880; Big Klickitat River *Cotton* 1490; without locality, *Vasey* in 1889; Mitchell Creek, Okanogan County, *Gorman* 835 (erroneously referred to *Aplopappus watsoni*); Mount Adams, *Henderson & Flett* 1068; Falcon Valley, *Suksdorf*, October 3, 1881.

ZONAL DISTRIBUTION: Arid Transition.

ERICAMERIA.

1. **Ericameria nana** Nutt. Trans. Am. Phil. Soc. **7**: 319. 1840.
Ericameria resinosa Nutt. loc. cit.
Aplopappus nanus D. C. Eaton in Wats. Bot. King Explor. 159. 1871.

TYPE LOCALITY: "On shelving rocks on the Blue Mountains of Oregon." Collected by Nuttall.

RANGE: Washington to Idaho and Nevada.

SPECIMENS EXAMINED: West Klickitat County, *Suksdorf* 338; mountains north of Ellensburg, *Whited* 862; North Yakima, *Mrs. Steinweg* in 1894; Yakima Region, *Brandegee* 845; Chelan, *Elmer* 855; Alkali Lake, *Sandberg & Leiberg* 418; cliffs at the mouth of the Tukanon, *Piper*.

ZONAL DISTRIBUTION: Arid Transition and Upper Sonoran.

HOOREBEKIA.

- Bracts of the involucre rigid.
  - Rays inconspicuous or wanting; leaves coriaceous or nearly so.
    - Heads large, solitary or few, discoid........................ 1. *H. carthamoides.*
    - Heads middle-sized, racemose; rays small................. 2. *H. racemosa.*
  - Rays conspicuous.
    - Leaves membranaceous, serrate, hirsute or villous.......... 3. *H. hirta.*
    - Leaves coriaceous, entire, glabrous........................ 4. *H. hallii.*
- Bracts of the involucre not rigid; leaves entire.
  - Plants herbaceous, low.
    - Involucre glandular; stems leafy.......................... 5. *H. lyallii.*
    - Involucre woolly; stems naked or nearly so................ 6. *H. lanuginosa.*
  - Plants shrubby, at least at base.
    - Leaves linear, very narrow, scabrous...................... 7. *H. stenophylla.*
    - Leaves lanceolate or oblong-spatulate, puberulent.......... 8. *H. greenei.*

1. **Hoorebekia carthamoides** (Hook.)
Pyrrocoma carthamoides Hook. Fl. Bor. Am. **1**: 307. *pl. 107*. 1833.
Aplopappus carthamoides A. Gray, Proc. Acad. Phila. **1863**: 65. 1863.

Type locality: "Northwest coast of America." Collected by Douglas.

Range: Washington, Oregon, and Idaho.

Specimens examined: Yakima region, *Brandegee* 841; Klickitat Prairie, *Howell* in 1880; White Salmon, *Suksdorf* 391; Tshimikaine [Chamokane], *Geyer* 588; Spokane County, *Suksdorf* 336.

Zonal distribution: Arid Transition.

1a. Hoorebekia carthamoides cusickii (A. Gray).

Aplopappus carthamoides cusickii A. Gray, Syn. Fl. **1^2**: 126. 1884.

Pyrrocoma cusickii Greene, Erythea **2**: 59. 1894.

Type locality: "Union Co., Oregon." Collected by Cusick.

Range: Washington and Oregon.

Specimens examined: Falcon Valley, *Suksdorf*, July 17, 1886; Kamiak Butte, *Piper*, July 20, 1899.

Zonal distribution: Arid Transition.

2. Hoorebekia racemosa (Nutt.).

Homopappus racemosus Nutt. Trans. Am. Phil. Soc. **7**: 332. 1840.

Pyrrocoma racemosa Torr. & Gr. Fl. **2**: 244. 1842.

Aplopappus racemosus Torr. in Sitgreaves Rep. 162. 1853.

Type locality: "Plains of the Wahlamet," Oregon. Collected by Nuttall.

Range: British Columbia to Saskatchewan, south to Nevada.

Specimens examined: Spokane County, *Suksdorf* 337; Pullman, *Piper* 1572.

Zonal distribution: Arid Transition.

3. Hoorebekia hirta (A. Gray).

Aplopappus hirtus A. Gray, Syn. Fl. **1^2**: 127. 1884.

Pyrrocoma hirta Greene, Erythea **2**: 69. 1894.

Type locality: Baker Co., Oregon. Collected by Cusick.

Range: Washington, Oregon, and Idaho.

Specimens examined: Yakima Region, *Brandegee*.

4. Hoorebekia hallii (A. Gray).

Aplopappus hallii A. Gray, Proc. Am. Acad. **8**: 389. 1872.

Type locality: "Bluffs of the Columbia River at the Dalles." Collected by Hall.

Range: Washington and Oregon.

Specimens examined: White Salmon, *Suksdorf* 389.

5. Hoorebekia lyallii (A. Gray).

Aplopappus lyallii A. Gray, Proc. Acad. Phila. **1863**: 64. 1863.

Type locality: Cascade Mountains, latitude 49°, at 2,270 m. altitude. Collected by Lyall.

Range: British Columbia to Montana and Oregon.

Specimens examined: Olympic Mountains, *Flett* 802; Cascade Mountains, east side at 2,270 meters, *Lyall* in 1860; Mount Adams, *Henderson*, August 10, 1892; *Howell*; *Suksdorf*.

Zonal distribution: Arctic.

6. Hoorebekia lanuginosa (A. Gray).

Aplopappus lanuginosus A. Gray in Torr. Bot. Wilkes Exped. 347. 1874.

Stenotus lanuginosus Greene, Erythea **2**: 72. 1894.

Type locality: "Upper part of the north fork of the Columbia River," Washington. Collected by the Wilkes Expedition.

Range: Washington and Oregon.

Specimens examined: Ellensburg, *Piper* 2701; upper Wenas River, *Henderson* 2291; Wenache, *Whited* 6, 1104, 1259; Yakima, *Brandegee* 844; Simcoe Mountains, *Howell* 285; Blue Mountains, *Piper* 2430.

Zonal distribution: Arid Transition.

7. **Hoorebekia stenophylla** (A. Gray).

Aplopappus stenophyllus A. Gray in Torr. Bot. Wilkes Exped. 347. 1874.

Stenotus stenophyllus Greene, Erythea **2**: 72. 1894.

TYPE LOCALITY: Spipen [Naches] River and north fork of the Columbia River. Collected by Pickering and Brackenridge.

RANGE: Washington and Idaho to California.

SPECIMENS EXAMINED: Mountains between Ellensburg and Wenache, *Whited* 28; Ellensburg, *Piper* 2685; North Yakima, *Mrs. Steinweg* in 1894; near Cleveland, *Suksdorf* 335; Klickitat County, *Howell* in 1882; Rattlesnake Mountains, *Cotton* 346.

ZONAL DISTRIBUTION: Arid Transition and Upper Sonoran.

8. **Hoorebekia greenei mollis** (A. Gray).

Aplopappus greenei mollis A. Gray, Syn. Fl. 1^2: 135. 1884.

Aplopappus mollis A. Gray, Proc. Am. Acad. **16**: 80. 1880.

Macronema molle Greene, Erythea **2**: 73. 1894.

TYPE LOCALITY: "High mountains of Union Co , Oregon." Collected by Suksdorf.

RANGE: Washington and Oregon.

SPECIMENS EXAMINED: Yakima region, *Brandegee* 839, 842; Lake Chelan, *Gorman* 845. Gorman's plant was mentioned in his paper on the Washington Forest Reserve as *Macronema suffruticosum* Nutt.

SOLIDAGO. GOLDENROD.

Branches of the panicle racemiform
Leaves thin; stems erect and tall.
Heads small, 4 to 5 mm. long, in very dense panicles.
Bracts of the panicle leaf-like .... 1. *S. caurina.*
Bracts of the panicle not leaf-like .... 2. *S. elongata.*
Heads larger, 5 to 7 mm. long in looser panicles .... 3. *S. serotina.*
Leaves thick and firm.
Involucral bracts thin, acutish .... 4. *S. tolmieana.*
Involucral bracts firm, obtuse .... 5. *S. missouriensis.*
Branches of the panicle not racemiform.
Involucral bracts acute; alpine .... 6. *S. corymbosa.*
Involucral bracts obtuse.
Panicle loose, raceme-like .... 7. *S purshii.*
Panicle dense, branched .... 8. *S. glutinosa.*

1. **Solidago caurina** Piper, Bull. Torr. Club **28**: 40. 1901.

TYPE LOCALITY: "Cascade Mts , Wash., above Lake Chelan."

RANGE: Cascade Mountains of Washington

SPECIMENS EXAMINED: Klickitat County, *Suksdorf* 30; Horseshoe Basin, *Lake and Hull* 818.

2. **Solidago elongata** Nutt. Trans Am. Phil Soc. **7**: 327. 1840.

TYPE LOCALITY: "Wappatoo Island and the plains of the Oregon." Collected by Nuttall.

RANGE: British Columbia to Montana and California.

SPECIMENS EXAMINED. Seattle, *Piper* 1136, Whatcom County, *Suksdorf* 974; Tacoma, *Flett* 67; upper Nisqually Valley, *Allen* 13; Puyallup, *Flett* 66; Leavenworth, *Savage* 4; Yakima County, *Henderson* 2318, Klickitat County, *Suksdorf* 30, McCloud Lake, *Suksdorf* 974; Fort Vancouver, *Douglas;* Trout Lake, *Flett* 1071, Fish Lake, *Dunn*, July 31, 1900; Stevens Pass, *Whited* 1443; Spokane County, *Henderson* 2317.

ZONAL DISTRIBUTION: Transition.

3. **Solidago serotina** Ait. Hort. Kew. 3: 211. 1789.

TYPE LOCALITY: "North America."

RANGE: Washington to Newfoundland, south to Nevada, Texas, and Georgia.

SPECIMENS EXAMINED: West Klickitat County, *Suksdorf* 29; Rock Island, *Sandberg & Leiberg* 449; Beaver Creek, *Whited* 17; Similkameen, *Lyall* in 1860; Pullman, *Piper* 3102; Wawawai, *Piper*, August 23, 1895, August 24, 1894; Newport, *Kreager* 451; Prosser, *Cotton* 811; Mabton, *Cotton* 756.

3a. **Solidago serotina salebrosa** Piper, Fl. Palouse Reg. 185. 1901.

TYPE LOCALITY: Pullman, Washington.

RANGE: Washington and Oregon eastward across the continent.

SPECIMENS EXAMINED: Seattle, *Piper*, August, 1892; Silver Lake, *Henderson* 2317; Peshastin, *Sandberg & Leiberg* 806; Klickitat County, *Suksdorf* 28; without locality, *Brandegee*; North Yakima, *Piper* 1785; *Watt*, August, 1895; Coulee City, *Lake & Hull* 797; Alma, *Elmer* 524; Lake Chelan, *Lake & Hull* 796; Union Flat, *Lake & Hull*, July 18, 1892; Pullman, *Piper* 1580; *Henderson* 2313.

ZONAL DISTRIBUTION: Arid Transition and Upper Sonoran.

This plant has frequently been considered a form of *S. canadensis* L., a species not known in our limits.

4. **Solidago tolmieana** A. Gray, Syn. Fl. 1^2: 151. 1884.

TYPE LOCALITY: Fort Vancouver, Wash., collected by Tolmie.

RANGE: Washington and Oregon in the coast region.

SPECIMENS EXAMINED: Olympia, *Henderson* 1708, 2316, 1709; *Kincaid;* Fort Vancouver, *Tolmie.*

ZONAL DISTRIBUTION: Humid Transition.

5. **Solidago missouriensis** Nutt. Journ. Acad. Phil. 7: 32. 1834.

TYPE LOCALITY: "On the upper branches of the Missouri and Arkansas."

RANGE: Washington to Manitoba, south to Texas.

SPECIMENS EXAMINED: Rattlesnake Mountains, *Cotton* 480; Peshastin, *Sandberg & Leiberg* 539; Coulee City, *Lake & Hull* 794; Rock Lake, *Lake & Hull* 795; Spokane, *Henderson* 2315; Spokane County, *Suksdorf* 926; Pullman, *Piper*; *Henderson* 2314; *Hull*, July 16, 1892; Waitsburg, *Horner* 573; Rattlesnake Mountains, *Cotton* 480.

ZONAL DISTRIBUTION: Arid Transition.

6. **Solidago corymbosa** Nutt. Trans. Am. Phil. Soc. 7: 328 1840.

Solidago multiradiata scopulorum A Gray, Proc. Am. Acad. 17: 191. 1882.

Solidago ciliosa Greene, Pittonia 3: 22. 1896.

Solidago hesperia Howell, Fl. N. W. Am. 303. 1900.

TYPE LOCALITY: "Central chain of the Rocky Mountains." Collected by Nuttall.

RANGE: British Columbia to California and New Mexico.

SPECIMENS EXAMINED: Olympic Mountains, *Piper* 2200, 2199; Mount Stuart, *Elmer* 1196; Mount Rainier, *Piper* 2158; *Smith* 1064; Baldy Peak, *Lamb* 1313, Silverton, *Bouck* 105; without locality, *Brandegee* 14; Loomis, *Elmer* 562.

ZONAL DISTRIBUTION: Hudsonian and Arctic.

7. **Solidago purshii** Porter, Bull. Torr. Club 21: 311. 1894.

Solidago humilis Pursh, Fl 2: 543. 1814.

TYPE LOCALITY. "In North America"

RANGE: Newfoundland to Virginia. Washington.

SPECIMENS EXAMINED: Mason County, *Piper* 886; *Kincaid*, June 15, 1892; Tacoma, *Flett* 878; without locality, *Henderson* 2319.

ZONAL DISTRIBUTION: Humid Transition.

These western specimens are so similar to the Atlantic coast plant that I am compelled so to refer them, notwithstanding the fact that the species is unknown in intermediate regions.

8. **Solidago glutinosa** Nutt. Trans. Am. Phil. Soc. **7**: 328. 1840.

Solidago confertiflora DC. Prod. **5**: 339 1836, not Nutt. 1834.

Type locality: "Plains of the Oregon and Wahlamet." Collected by Nuttall.

Range: Washington and Oregon in the coast region.

Specimens examined: Shoalwater Bay, *Cooper*; Fort Nisqually, *Wilkes Expedition*, Coupeville, *Gardner* 423.

Zonal distribution: Humid Transition.

EUTHAMIA.

1. **Euthamia occidentalis** Nutt. Trans. Am. Phil. Soc. **7**: 326. 1840.

Solidago occidentalis Torr. & Gr. Fl. N. Am. **2**: 226. 1841.

Type locality: "Banks of the Oregon and Wahlamet, and Lewis River." Collected by Nuttall.

Range: British Columbia to California and New Mexico.

Specimens examined: Seattle, *Piper*, August 1892; North Yakima, *Watt*, August, 1895; Ellensburg, *Whited* 589; banks of Columbia, *Brandegee* 868; Okanogan River, *Watson* 190; Coulee City, *Lake & Hull* 793; Spokane, *Elmer* 869; *Piper*, October 1, 1900; Pullman, *Piper* 4114; Spokane, *Kreager* 550; Prosser, *Cotton* 887; Vancouver, *Sheldon* 11290.

Zonal distribution: Upper Sonoran and Transition.

TOWNSENDIA.

1. **Townsendia florifer** (Hook.) A. Gray, Proc. Am. Acad. **16**: 84. 1880.

Townsendia strigosa Nutt. err. det. Gray in Torr. Bot. Wilkes Exped. **17**: 344. 1874.

Erigeron florifer Hook. Fl. Bor. Am. **2**: 20. 1834.

Type locality: "Near Priests Rapids of the Columbia." Collected by Douglas.

Range: Washington and Oregon east of the Cascade Mountains.

Specimens examined: Tampico, *Flett* 1107; Morgans Ferry, *Suksdorf* 347; opposite Willows, *Howell;* Wenas Valley, *Lyall* in 1860; Yakima Reservation, *Miss Cooley*, July, 1891; North Yakima, *Watt*, August, 1895; *Steinweg* in 1894; Ellensburg, *Piper* 2687; Pasco, *Piper* 2988; *Elmer* 1058; *Hindshaw* 9; without locality, *Henderson* in 1892: Coulee City, *Piper* 3862; Ritzville, *Sandberg & Leiberg* 169.

Zonal distribution: Upper Sonoran.

ERIGERON.

- Rays conspicuous, much surpassing the disk.
  - Root stout, perennial or perennating by offsets.
    - Tall species with flat, rather broad and large leaves.
      - Rays narrow, 100 to 150; involucre smooth or hirsute, not viscid.
        - Leaves entire; involucre usually hirsute; not stoloniferous.................... 1. *E. speciosus.*
        - Leaves dentate; involucre smooth; stoloniferous.......................... 16. *E. philadelphicus.*
      - Rays broader, 30 to 50; involucre viscid.
        - Leaves thick; rays pink.............. 2. *E. salsuginosus.*
        - Leaves thin; rays violet.............. 3. *E. membranaceus.*
    - Low species; leaves either narrow or mostly basal.
      - Rays yellow.
        - Heads solitary; leaves obovate or spatulate .... 12. *E. aureus.*
        - Heads several; leaves linear.

Leaves hispidulous, curved; rays pale yellow .... 5. ***E. curvifolius.***

Leaves canescent-puberulent, straight; rays bright yellow...... 10. ***E. filifolius.***

Rays not yellow.

Leaves cleft or parted.

Leaves parted into narrow lobes.... 9. ***E. compositus.***

Leaves merely 3 to 5-cleft.......... 9a. ***E. compositus trifidus.***

Leaves entire or merely toothed.

Stems branched, leafy, usually bearing several heads.

Pubescence long and dense; rays blue, pink or white...... 4. ***E. hispidissimus.***

Pubescence very short.

Leaves linear-lanceolate, 3-nerved .... 6. ***E. corymbosus.***

Leaves filiform or linear, 1-nerved .... 11. ***E. linearis***

Stems simple, scapiform; head always solitary.

Leaves dentate, broadly spatulate.

Involucre glandular; stems not producing offsets.... 13. ***E. leibergii.***

Involucre glabrate; stems producing rosulate offsets. 15. ***E. oreganus.***

Leaves entire; involucre not glandular.

Rays white, leaves linear-lanceolate.............. 8. ***E. nevadensis.***

Rays violet.

Involucre very woolly. 14. ***E. uniflorus.***

Involucre hispidulous. 7. ***E. poliospermus.***

Roots annual, fibrous; leaves toothed or lobed.

Stems diffusely branched; rays pink 100 to 120... 17. ***E. divergens.***

Stems erect, branched above; rays white 40 to 60.. 18. ***E. ramosus.***

Rays very short or wanting.

Plants low, root stout, perennial; heads solitary to numerous.

Leaves ternately cleft or parted; involucre hirsute. 9b. ***E. compositus discoideus.***

Leaves linear or linear-spatulate, narrow; involucre villous .... 20. ***E. bloomeri.***

Plants tall; heads several to numerous.

Rays wanting; heads cymose; leaves firm; root perennial .... 19. ***E. eradiatus.***

Rays present, short.

Heads paniculate; involucre glabrous; root annual .... 21. ***E. canadensis.***

Heads corymbose; involucre hirsute at least at base; roots biennial.

Tall, 30 to 60 cm.; heads many......... 22. ***E. acris.***

Low 10 to 20 cm.; heads few........... 22a. ***E. acris debilis.***

1. **Erigeron speciosus** DC. Prod. **5**: 284. 1833.
Stenactis speciosa Lindl. Bot. Reg. *t. 1577*. 1833.

TYPE LOCALITY: "California." Collected by Douglas.

RANGE: British Columbia to southern Oregon, Idaho, and Colorado.

SPECIMENS EXAMINED: Olympic Mountains, *Flett* 812; Whidby Island, *Gardner* 175; Lake Park, *Piper*, July 27, 1895; Lopez Island, *Lyall* in 1858; Olympia, *Heller* 4041; Fort Vancouver, *Tolmie;* Mount Stuart, *Elmer* 1110; Peshastin, *Sandberg & Leiberg* 476; Upper Naches River, *Henderson*, June 15, 1892; along Twisp River, *Whited* 41; Leavenworth, *Whited*, August 6, 1896; Tieton River, *Cotton* 439; upper Nisqually Valley, *Allen* 222; west Klickitat County, *Suksdorf* 561; Falcon Valley, *Suksdorf* 401; Yakima region, *Brandegee* 880; Conconully, *Whited* 1317; Wenache foothills, *Whited* 1295, 1182; Trout Lake, *Flett* 1090; Loomis, *Elmer* 578; Fort Colville to Cascades, *Lyall* in 1860; without locality, *Vasey* 513.

ZONAL DISTRIBUTION: Transition.

2. **Erigeron saluginosus** (Richards.) A. Gray, Proc. Am. Acad. **16**: 93. 1881.
Aster salsuginosus Richards. Bot. App. Frankl. Journ. **2**: 748. 1823.

TYPE LOCALITY: "On the Salt Plains in the Athabasca."

RANGE: Alaska to California and New Mexico.

SPECIMENS EXAMINED: Mount Rainier, *Allen* 30; *Smith*, August, 1890; *Piper* 2148; Cascade Mountains, latitude 49°, *Lyall* in 1859; Mount Adams, *Suksdorf* 560; *Flett* 1092; upper Atanum River, *Henderson*, August, 1892; Nason Creek, *Sandberg & Leiberg* 353; Cascade Mountains, Yakima County, *Henderson*, August, 1892; near Skagit Pass, *Lake & Hull*, August 27, 1892; between Wenache and Ellensburg, *Whited*, August, 1896; Yakima region, *Brandegee* 876; without locality, *Vasey* 510.

ZONAL DISTRIBUTION: Hudsonian and Arctic.

2a. **Erigeron salsuginosus angustifolius** A. Gray, Proc. Am. Acad. **16**: 93. 1880.

TYPE LOCALITY: "California."

RANGE: Washington to California.

SPECIMENS EXAMINED: Mount Rainier, *Allen* 142; Silverton, *Bouck* 110; Yakima region, *Brandegee* 877.

3. **Erigeron membranaceus** Greene, Pittonia **3**: 294. 1898.

TYPE LOCALITY: "Eastern Oregon" in the Blue Mountains. Collected by Cusick.

RANGE: Blue Mountains of Washington and Oregon.

SPECIMENS EXAMINED: Blue Mountains, *Piper* 2401.

ZONAL DISTRIBUTION: Hudsonian.

4. **Erigeron hispidissimus** (Hook.)
Erigeron strigosus hispidissimus Hook. Fl. Bor. Am. **2**: 18. 1834.
Erigeron concinnus Torr. & Gr. Fl. **2**: 174. 1841.
Distasis concinna Hook. & Arn. Bot. Beech. Voy. 350. 1840.

TYPE LOCALITY: "Plentiful in the vallies of the Blue Mountains and of the Spokane River." Collected by Douglas.

RANGE: British Columbia to New Mexico and Arizona.

SPECIMENS EXAMINED: Ellensburg, *Whited* 447; North Yakima, *Mrs. Steinweg* in 1894; *Watt* in 1895; Yakima, *Henderson*, May 25, 1892; Wenache, *Whited*, July, 1895, and 1098; Bickleton, *Suksdorf* 352; Naches, *Lyall* in 1860; Rattlesnake Mountains, *Cotton* 403; Pasco, *Hindshaw* 51; Crab and Wilson creeks, *Sandberg & Leiberg* 236; Ritzville, *Sandberg & Leiberg* 195; Colville, *Lyall* in 1860; Medical Lake, *Henderson* 2302, 2304; Moses Coulee, *Lake & Hull* 696; Spokane, *Piper* 2275, 1831; *Savage* 14; *Elmer* 375; between Coulee City and Waterville, *Spillman*, May, 1896; Waitsburg, *Horner* 170; Brewster, *Griffiths & Cotton* 348.

ZONAL DISTRIBUTION: Arid Transition and Upper Sonoran.

5. Erigeron curvifolius Piper, Bull. Torr. Club **27**: 396. 1900.

(*Chrysopsis hirtella* DC. Prod. **5**: 327. 1836, not *Erigeron hirtellus* DC. Prod. **5**: 290. 1836.

TYPE LOCALITY: Morgan's Ferry, Yakima County, Washington. Collected by Suksdorf.

RANGE: Eastern Washington.

SPECIMENS EXAMINED: Snipes Mountain, *Cotton* 384; Soap Lake, *McKay* 5; Morgans Ferry, Yakima County, *Suksdorf*, June 7, 1884; Washtucna, *Elmer* 1036; Pasco, *Hindshaw*, May 25, 1896; *Piper* 2993; Connell, *Leckenby*, June 18, 1897; near Ephrata, *Griffiths & Cotton* 494; Kahlotus, *Cotton* 1099; Prosser, *Cotton* 1100, 1075.

ZONAL DISTRIBUTION: Upper Sonoran.

This species was included by Doctor Gray in *E. chrysopsidis* Gray. The type locality of that is given as "E. Oregon and adjacent Washington Terr., *Douglas*, *Cusick*, *Nevius*, *Howell*."

6. Erigeron corymbosus Nutt. Trans. Am. Phil. Soc. **7**: 308. 1840.

TYPE LOCALITY: "Rocky Mountains towards the Oregon." Collected by Nuttall.

RANGE: Washington to Montana and California.

SPECIMENS EXAMINED: Ellensburg, *Elmer* 374; *Whited* 515, 678 and June 27, 1897; Wenache, *Whited* 1144; Rock Island, *Sandberg & Leiberg* 458; Chelan, *Whited* 138, 7; Crab and Wilson creeks, *Sandberg & Leiberg* 254; Coulee City, *Lake* 719; Medical Lake, *Henderson* 2303, July, 1892; Spangle, *Suksdorf* 351; without locality, *Vasey* 520, 125; Pullman, *Piper* 1601; Walla Walla region, *Brandegee* 872; Illia, *Lake & Hull* 695; Spokane, *Piper*, June 25, 1897; without locality, *Wilkes Expedition;* Rattlesnake Mountains, *Cotton* 689.

ZONAL DISTRIBUTION: Arid Transition.

7. Erigeron poliospermus A. Gray, Syn. Fl. 1^2: 210. 1884.

TYPE LOCALITY: "Umatilla, Oregon." Collected by Howell.

RANGE: Eastern Washington and eastern Oregon.

SPECIMENS EXAMINED: Ellensburg, *Piper*, May 21, 1897; *Whited* 720; North Yakima, *Leckenby*, April 22, 1898; *Steinweg: Henderson*, May 25, 1892; Wenache, *Whited*, May 27, 1896, 1085; Tampico, *Flett* 1064; Columbus, *Suksdorf*, April 13, 1886; Bickleton, *Suksdorf* 348; Rattlesnake Mountains, *Cotton* 331; Klickitat River, *Flett* 1106 in part; Coulee City, *Piper* 3888; Wilson Creek, *Lake & Hull*, August 6, 1892; Spokane, *Leiberg* 39; Walla Walla, *Brandegee* 869; *Tweedy* 922; Prosser, *Cotton* 586.

ZONAL DISTRIBUTION: Upper Sonoran.

8. Erigeron nevadensis A. Gray, Proc. Am. Acad. **8**: 649. 1873.

TYPE LOCALITY: Near Virginia City, Nevada. Collected by Bloomer.

RANGE: Washington to California and Nevada.

SPECIMENS EXAMINED: Without locality, *Brandegee* 875.

9. Erigeron compositus Pursh, Fl. **2**: 535. 1814.

TYPE LOCALITY: "On the banks of the Kooskoosky," Idaho. Collected by Lewis.

RANGE: Washington to California and Colorado.

SPECIMENS EXAMINED. Spokane, *Piper* 2289; Spokane Hills, *Lyall* in 1861; Spokane, *Henderson* 2306; *Sandberg & Leiberg* 1.

ZONAL DISTRIBUTION: Upper Sonoran and Arid Transition.

9a. Erigeron compositus trifidus (Hook.) A. Gray, Proc. Am. Acad. **16**: 90. 1881.

Erigeron trifidus Hook. Fl. Bor. Am. **2**: 17. 1834.

TYPE LOCALITY: "Barren places among the Rocky Mountains."

RANGE. British Columbia to Colorado and California.

SPECIMENS EXAMINED: Mount Rainier, *Smith* 496; *Piper* 2144; Mount Adams, *Flett* 1079; *Suksdorf; Henderson*, August 10, 1892; Olympic Mountains, *Piper*, August, 1895; *Flett* 120; *J. M. Grant* 30; Mount Stuart, *Elmer* 1211; Klickitat River, *Flett* 1106.

ZONAL DISTRIBUTION: Arctic.

9b. Erigeron compositus discoideus A. Gray, Am. Journn. Sci. II. **33**: 237. 1862.

Type locality: Rocky Mountains, Colorado. Collected by Parry.

Range: Washington to Colorado.

Specimens examined: Cascade Mountains, latitude 49° at 2,100 meters, *Lyall* in 1860.

10. Erigeron filifolius (Hook.) Nutt. Trans. Am. Phil. Soc. **7**: 308. 1840.

Diplopappus filifolius Hook. Fl. Bor. Am. **2**: 21. 1834.

Chrysopsis canescens DC. Prod. **5**: 328. 1836.

Erigeron peucephyllus A. Gray, Proc. Am. Acad. **16**: 89. 1880.

Type locality: "Common on the Great Falls of the Columbia, and barren grounds of the interior." Collected by Douglas.

Range: British Columbia to California and Nevada.

Specimens examined: Wenache, *Whited* 83, 27, 1074; Ellensburg, *Piper* 2684; *Whited* 352, 641; *Elmer* 368; Yakima, *Leckenby*, May 11, 1898; North Yakima, *Mrs. Steinweg* in 1894; *Watt*, June, 1892; Sunnyside, *Cotton* 355; Rattlesnake Mountains, *Cotton* 363; Toppenish, *Henderson*, May 28, 1892; Bickelton, *Suksdorf* 334; Wenas Valley, *Lyall* in 1860; Tampico, *Flett* 1065; Crab and Wilson creeks, *Sandberg & Leiberg* 233; Cheney, *Mrs. Susan Tucker* in 1890 and 1892; Sprague, *Sandberg & Leiberg* 142; Coulee City, *Piper* 3860; Spangle, *Piper*, June 24, 1899; without locality, *Vasey* 503; Walla Walla region, *Brandegee* 873, 874.

Zonal distribution: Upper Sonoran and Arid Transition.

11. Erigeron linearis (Hook.)

Diplopappus linearis Hook. Fl. Bor. Am. **2**: 21. 1834.

Type locality: "Common on dry rocks and sandy grounds near the "Priests Rapids" of the Columbia, and also on Lewis and Clarkes River." Collected by Douglas.

Range: British Columbia to California and Nevada.

Specimens examined: Wenache, *Whited* 72, 1116; *Elmer* 477; Wenache Mountains, *Whited*, June 23, 1901; Ellensburg, *Piper* 2741; *Whited* 655, 514; *Elmer* 372; North Yakima, *Brandegee; Watt;* Yakima County, *Suksdorf* 350; Cleman Mountain, *Henderson* in 1892; Wenas River, *Henderson* in 1892; Pasco, *Henderson* in 1892; White Bluff Ferry, *Lake & Hull;* Connell, *Leckenby;* Washtucna, *Elmer* 1039; Coulee City, *Lake & Hull* 817, *Piper* 3844; Crab and Wilson creeks, *Sandberg & Leiberg* 255; Mount Stuart, *Elmer* 1111; Colville, *Watson* 207; Columbus, *Suksdorf;* Lake Chelan, *Lake & Hull* 817; Spokane, *Sandberg, Heller, & McDougal* 915; without locality, *Vasey* 511; Rocky Mountains and Walla Walla, *Nuttall;* Spokane, *Piper* 2274; Snipes Mountain, *Cotton* 387; Soap Lake, *McKay* 6, Stehekin, *Whited* 1389.

Zonal distribution: Upper Sonoran.

12. Erigeron aureus Greene, Pittonia **2**: 169. 1891.

Aplopappus brandegei A. Gray, Syn. Fl. ed. 2. 1^2: 132. 1886, not *Erigeron brandegei* A. Gray. 1884.

Type locality: "Mountains of Washington in the Yakima district." Collected by Brandegee.

Range. Cascade Mountains, Washington.

Specimens examined: Mount Stuart, *Elmer* 1105, *Brandegee* 85, Mount Rainier, *Piper* 2150, 523; *Allen* 94, Stevens Pass, *Sandberg & Leiberg* 782; above Lake Chelan, *T. E. Wilcox* in 1883, North Fork of Bridge Creek, *Elmer* 698.

Zonal distribution: Arctic.

13. Erigeron leibergii Piper, Bull. Torr. Club **28**: 41. 1901.

Type locality Mount Stuart, Washington, at 2,460 meters altitude.

Range. Known only from the type locality

Specimens examined: Mount Stuart, *Sandberg & Leiberg* 810.

14. Erigeron uniflorus L Sp Pl. **2**: 864 1753.

Type locality. "Habitat in Alpibus Lapponiae, Helvetiae"

Range: Alaska to Labrador south to California and Colorado.

Specimens examined: Cascade Mountains, *Dr. Cooper.*

15. Erigeron oreganus A. Gray, Proc. Am. Acad. **19**: 2. 1883.

Type locality: "Oregon, along the Columbia River, under overhanging cliffs, in Multnomah Co.," Howell.

Range: Bluffs of the Columbia River below the Cascades on both sides of the river.

Specimens examined: Cape Horn, *Piper* 4983, 5010.

16. Erigeron philadelphicus L. Sp. Pl. **2**: 863. 1753.

Erigeron occidentale Nutt. Trans. Am. Phil. Soc. **7**: 311 1840.

Type locality: Canada

Range: Throughout most of Temperate North America.

Specimens examined: Whidby Island, *Gardner* 179; Snohomish, *Kincaid*, June 3, 1892; Silverton, *Bouck* 109; Peshastin, *Sandberg & Leiberg* 469; Deming, *Flett* 870; Lake Conconully, *Whited* 1318; Cascade Mountains to Colville, *Lyall* in 1860, Loomis, *Elmer*, August, 1897; Waitsburg, *Horner* 175.

Zonal distribution: Transition.

17. Erigeron divergens Torr. & Gr. Fl. N. Am. **2**: 175. 1841

Erigeron divaricatus Nutt. Trans. Am. Phil. Soc. **7**: 311 1840, not Michx 1803.

Type locality: "In the Rocky Mountains and the plains of Oregon." Collected by Nuttall.

Range: Washington to California, Nebraska, and Texas

Specimens examined: Wenache, *Whited* 72, 73, 74, *Elmer* 480; west Klickitat County, *Suksdorf* 563; Rock Island, *Sandberg & Leiberg* 455, between Coulee City and Waterville, *Spillman*, May, 1896; Marshall Junction, *Piper* 2257. Wawawai, *Elmer*, June, 1897; *Piper*, July 8, 1898; Almota, *Piper* 1832.

Zonal distribution. Upper Sonoran.

18. Erigeron ramosus (Walt.) B. S. P. Prel. Cat. N. Y. 27. 1888.

Doronicum ramosum Walt., Fl. Car. 205. 1788.

Erigeron strigosus Muhl., Willd. Sp. Pl. **3**: 1956. 1803.

Type locality: Pennsylvania.

Range: British Columbia to Nova Scotia south to California, Texas, and Florida.

Specimens examined: Cascade Mountains to Fort Colville, *Lyall* in 1860; Steilacoom, *Piper;* Fort Vancouver, *Piper* 3077; Wenache, *Elmer* 482; Waitsburg, *Horner* 353 and July 27, 1896; Spokane, *Piper*, June 25, 1897; Union Flat, *Lake & Hull* 697; Pullman, *Piper* 1821.

Zonal distribution: Transition.

19. Erigeron eradiatus (A. Gray).

Erigeron douglasii eradiatum A. Gray, Pac. R. Rep. **12**^{2}: 5. 1860.

Erigeron inornatus A. Gray, Proc. Am. Acad. **16**: 88. 1880.

Erigeron foliosus inornatus A. Gray, Bot. Cal. **1**: 320. 1876.

Type locality: "Sandy pine forest on the table-land east of Mount Adams," Washington. Collected by Cooper.

Range: Washington to California.

Specimens examined: Cascade Mountains, *Cooper;* Falcon Valley, *Suksdorf* 400; Big Klickitat River, *Henderson*, August 21, 1892; Blue Mountains, *Horner* 349.

Zonal distribution: Arid Transition.

20. Erigeron bloomeri A. Gray, Proc. Am. Acad. **6**: 40. 1865.

Type locality: "Near Virginia City, Nevada."

Range: Washington to Nevada and California.

Specimens examined: Yakima County, *Henderson* 2305; Blue Mountains, *Piper* 2392.

Zonal distribution: Hudsonian.

21. **Erigeron canadensis** L. Sp. Pl. **2**: 863. 1753.

Type locality: "Canada, Virginia."

Range: Temperate North America.

Specimens examined: Mason County, *Kincaid* in 1892; North Yakima, *Watt*, August, 1895; Leavenworth, *Whited*, August 6, 1896; Lake Chelan, *Lake & Hull*, August 14, 1892; Loomis, *Elmer* 567; Prosser, *Cotton* 886.

Zonal distribution: Transition and Upper Sonoran.

22. **Erigeron acris** L. Sp. Pl. **2**: 863. 1753.

Type locality: European.

Range: British Columbia to Labrador south to Oregon and Colorado. Europe. Asia.

Specimens examined: Goose Lake, *Flett* 1156; Falcon Valley, *Suksdorf* 353; Yakima Region, *Brandegee* 878; Cascade Mountains, 49°, *Lyall* in 1860; Stevens Pass, *Sandberg & Leiberg* 765; Stampede Tunnel, *Henderson*, July 26, 1892.

Zonal distribution: Arid Transition and Canadian.

22a. **Erigeron acris debilis** A. Gray, Syn. Fl. 1^2: 220. 1884.

Type locality: "Northern Rocky and Cascade Mountains, Montana, *Canby*, *Sargent*, at Woodruffs Falls, * * * ; Mount Paddo, *Suksdorf*, *Howell*."

Range: Alaska to Labrador south to Washington and Montana.

Specimens examined: Olympic Mountains, *Flett* 820; Mount Adams, *Suksdorf* 70, 402, 2170; *Howell* in 1882; *Flett* 1156; *Henderson*, August 9, 1892; Skamania County, *Suksdorf* 2170; Loomis, *Elmer* 591.

Zonal distribution: Arctic.

Erigeron glabellus mucronatus Hook. Fl. Bor. Am. **2** : 19. 1834. Type locality, "Plentiful on low plains of the Columbia, near the coast." We have been unable to determine what this plant is from the brief description.

SERICOCARPUS.

1. **Sericocarpus rigidus** Lindl. in Hook. Fl. Bor. Am. **2** : 14. 1834.

Sericocarpus oregonensis Nutt. Trans. Am. Phil. Soc. **7**: 302. 1840.

Type locality: "Columbia River." Collected by Scouler.

Range: Washington to California in the coast region.

Specimens examined: Whidby Island, *Gardner* 154; Tacoma, *Flett* 164, 876; Olympia, *Henderson* 1706; McAllisters Lake, *Henderson*, July 22, 1888; Fort Vancouver, *Tolmie*.

Zonal distribution: Humid Transition.

OREASTRUM.

1. **Oreastrum alpigenum** (Torr. & Gr.) Greene, Pittonia **3**: 147. 1896.

Aster alpigenus A. Gray, Proc. Am. Acad. **8**: 389. 1872.

Aplopappus alpigenus Torr. & Gr. Fl. N. Am. **2**: 241. 1842.

Aster pulchellus D. C. Eaton in S. Wats. Bot. King Explor. 143. *t. 16.* 1871.

Type locality: Mount Rainier, Washington Collected by Tolmie.

Range: Cascade Mountains, Washington and Oregon.

Specimens examined: Mount Rainier, *Allen* 143; *Piper* 498, 2156; *Tolmie;* Mount Stuart, *Elmer* 1094; without locality, *Brandegee* 18, 20, 32; Mount Adams, *Suksdorf* in 1878 and 522; *Flett* 1091.

Zonal distribution: Arctic.

EUCEPHALUS.

Rays purple or violet.
Rays white, becoming pink-tinged .... 1. *E. paucicapitatus.*
  Leaves tomentose beneath .... 2. *E. ledophyllus.*
  Leaves glabrous.
    Leaves glaucous, broadly lanceolate .... 3. *E. glaucophyllus.*
    Leaves green.

Leaves broadly lanceolate .... 4. *E. engelmanni.*

Leaves narrowly lanceolate .... 5. *E. serrulatus.*

1. Eucephalus paucicapitatus (Robinson) Greene, Pittonia **3**: 56. 1896.

Aster paucicapitatus Robinson, Proc. Am. Acad. **29**: 329. 1894.

Aster engelmanni paucicapitatus Robinson, Proc. Am. Acad. **26**: 176. 1891.

TYPE LOCALITY: Olympic Mountains, Washington.

RANGE: Olympic Mountains.

SPECIMENS EXAMINED: Olympic Mountains, *Piper* 2195; *Flett* 819.

ZONAL DISTRIBUTION: Hudsonian.

2. Eucephalus ledophyllus (A. Gray) Greene, Pittonia **3**: 55. 1896.

Aster ledophyllus A. Gray, Proc. Am. Acad. **16**: 98. 1880.

Aster engelmanni ledophyllus A. Gray, Proc. Am. Acad. **8**: 388. 1872.

TYPE LOCALITY: "In the Cascade Mountains." Collected by Lyall.

RANGE: British Columbia to Oregon in the Cascade Mountains.

SPECIMENS EXAMINED: Mount Rainier, *Piper* 2147; *Allen* 284; Mount Adams, *Henderson*, August 5, 1892; *Suksdorf* 61.

ZONAL DISTRIBUTION: Hudsonian.

3. Eucephalus glaucophyllus nom. nov.

Aster engelmanni glaucescens A. Gray, Syn. Fl. ed. 2. 1^2: 200. 1886, not *Aster glaucescens* Wender. 1832.

Eucephalus glaucescens Greene, Pittonia **3**: 56. 1896.

TYPE LOCALITY: "On Mount Paddo" [Adams], Washington. Collected by Suksdorf.

RANGE: Washington to California.

SPECIMENS EXAMINED: Mount Adams, *Henderson*, August 12, 1892; *Suksdorf* 651; *Howell* 401; *Flett* 1089; Simcoe Mountains, *Howell*, September 1880; Falcon Valley, *Suksdorf* 398; Skamania County, *Suksdorf*, August 10, 1886.

ZONAL DISTRIBUTION: Hudsonian.

4. Eucephalus engelmanni (A. Gray) Greene, Pittonia **3**: 54. 1896.

Aster engelmanni A. Gray, Syn. Fl. 1^2: 199. 1884.

Aster elegans engelmanni D. C. Eaton in S. Wats. Bot. King Explor. 144. 1871.

TYPE LOCALITY: "Cascade Mountains, latitude 49°." Collected by Lyall.

RANGE: British Columbia to Utah and Wyoming.

SPECIMENS EXAMINED: Cascade Mountains, latitude 49°, *Lyall;* Colville to Cascade Mountains, latitude 49°, *Lyall* in 1860; head of Twisp River, *Whited* 39; Atanum River, *Henderson*, August 2, 1892; Stehekin, *Whited* 1401; near Skagit Pass, *Lake & Hull* 693; North Fork Bridge Creek, *Elmer* 649; without locality, *Vasey* 526; Mount Stuart, *Sandberg & Leiberg* 559; Clealum Lake, *Cotton* 869, Fort Simcoe, *Cotton* 1562.

ZONAL DISTRIBUTION: Canadian and Hudsonian.

5. Eucephalus serrulatus Greene, Pittonia **3**: 55. 1896.

TYPE LOCALITY: Mount Adams. Collected by Suksdorf (no. 1563).

Known only from the type collection. The plant is exceedingly close to *E. engelmanni.*

ASTER.

Leaves coriaceous, serrate; involucre well imbricated.

Involucre campanulate, glandular .... 1. *A. conspicuus.*

Involucre broadly turbinate, not glandular .... 2. *A. radulinus.*

Leaves membranaceous.

Involucre viscid or pruinose-glandular.

Heads less than 1 cm. broad .... 3. *A. campestris.*

Heads over 1 cm. broad.

Leaves entire, firm; bracts rather rigid, well imbricated. 4. *A. integrifolius.*

Leaves serrate, not firm; bracts not rigid, loose .... 5. *A. major.*
Involucre not viscid or glandular.
Heads less than 1 cm. broad.
Rays purple; involucre turbinate .... 6. *A. amethystinus.*
Rays usually white; involucre campanulate.
Herbage harshly puberulent........................ 7. *A. multiflorus.*
Herbage not harshly puberulent.
Involucral bracts acute .... 8. *A. oreganus.*
Involucral bracts obtuse .... 9. *A. hallii.*
Heads more than 1 cm. broad.
Involucral bracts closely appressed, mainly coriaceous.
Akenes glabrous.
Leaves glaucous, entire .... 10. *A. laevis.*
Leaves green, serrate, glabrous .... 11. *A. elmeri.*
Akenes pubescent; leaves puberulent, entire ...... 12. *A. jessicae.*
Involucral bracts looser, largely herbaceous.
Leaves few, large, scarcely reduced upward, the cauline with auriculate or clasping bases.
Heads solitary or few, long-peduncled; leaves dark green, usually glabrous.............. 13. *A. foliaceus.*
Heads several; stems leafy to the top; leaves thin, pale, usually pubescent............... 14. *A. cusickii.*
Leaves numerous, either small, or much reduced upward; cauline sessile, not at all auriculate.
Pubescent throughout; involucral bracts herbaceous, lanceolate, flat................. 15. *A. wattii.*
Glabrous or nearly so; involucral bracts narrow, acute.
Involucral bracts, at least the outer ones, foliaceous and passing into the leaves.
Leaves firm, entire, numerous ...... 16. *A. eatoni.*
Leaves thinner, less numerous, usually serrate near the middle .... 17. *A. douglasii.*
Involucral bracts not at all foliaceous.
Heads corymbose.
Leaves serrulate, those of the inflorescence much reduced.. 18. *A. occidentalis.*
Leaves entire, those of the inflorescence not much reduced... 19. *A. fremontii.*
Heads solitary, naked-pedunculate... 20. *A. stenomeres.*

1. **Aster conspicuus** Lindl. Hook. Fl. Bor. Am. **2**: 7. 1834.
Aster macdougalii Coult. & Fisher, Bot. Gaz. **18**: 301. 1893.
TYPE LOCALITY: "Carlton House." Collected by Drummond.
RANGE: British Columbia to Saskatchewan south to Oregon and Montana.
SPECIMENS EXAMINED. Peshastin, *Sandberg & Leiberg* 494; foothills near Wenache, *Whited* 6, 1290, 1294; Ophir, *Elmer* 529; Lake Chelan, *Lake & Hull* 692, Alma, *Elmer* 538; Fort Colville, *Lyall* in 1860; *Geyer;* Spokane County, *Suksdorf* 927; Kamiak Butte, *Piper;* near Colton, *Piper*, July, 1898; Blue Mountains, *Piper*, July and August, 1896.
ZONAL DISTRIBUTION: Arid Transition.

2. **Aster radulinus** A. Gray, Proc. Am. Acad. **8**: 388. 1872.
Aster radula Less. Linnaea **6**: 125 1831, not Ait. 1789.
TYPE LOCALITY: "In California." Collected by Chamisso.
RANGE: Washington to California.

Specimens examined: North Yakima, *Mrs. Steinweg*, August, 1894; *Watt*, August, 1895; Falcon Valley, *Suksdorf* 395; White Salmon, *Suksdorf* 394; *Howell;* without locality, *Vasey* 512; Trout Lake, *Flett* 1074; Klickitat River, *Cotton* 1440.

Zonal distribution. Transition.

3. Aster campestris Nutt. Trans. Am. Phil. Soc. **7**: 293. 1840.

Type locality: "Along the plains of Lewis River," probably in southern Idaho. Collected by Nuttall.

Range: Washington to Montana and northern California.

Specimens examined: Falcon Valley, *Suksdorf* 68; *Howell* in 1882; Wilson Creek, *Lake & Hull* 815, 816; Sprague, *Lake & Hull*, August, 1895, July 9, 1892; Lake Chelan, *Lake & Hull* 720; Spokane Falls, *Watson* 195; Spokane County, *Suksdorf* 928; *Spalding;* without locality, *Brandegee;* Walla Walla, *Mrs. Anderson;* Waitsburg, *Horner* 550, 553.

Zonal distribution: Upper Sonoran and Arid Transition.

3a. Aster campestris suksdorfii subsp. nov.

Differs from true *A. campestris* in being canescent all over with short hairs that are not at all appressed.

Type specimen in the Gray Herbarium. Collected on Little Klickitat River, October 5, 1882, by Suksdorf.

4. Aster integrifolius Nutt. Trans. Am. Phil. Soc. **7**: 291. 1840.

Type locality: "Near the summit of Thornberg's Pass." Collected by Nuttall.

Range: Washington to California, Colorado and Montana.

Specimens examined: Blue Mountains, *Horner* 364.

5. Aster major (Hook.) Porter, Mem. Torr. Club **5**: 325. 1894.

Aster unalaschensis major Hook. Fl. Bor. Am. **2**: 7. 1834.

Aster modestus Lindl.; Hook. Fl. Bor. Am. **2**: 8. 1834.

Aster sayianus Nutt. Trans. Am. Phil. Soc. **7**: 294. 1840.

Type locality: "Saskatchewan to the Rocky Mountains," or as given by Lindley, "Mountain woods at the mouth of Smoking River, Lat. 56° N." Collected by Drummond.

Range. British Columbia and Oregon eastward to Ontario.

Specimens examined: Cascade Mountains, latitude 49°, *Lyall* in 1859; Nisqually Valley, *Allen* 125a; Falcon Valley, *Suksdorf* 64; Skokomish River, *Piper* 2189; plains of Columbia, *Nuttall;* Beaver Creek, *Whited* 29; Minastash Canyon, *Whited*, August 29, 1897; Yakima region, *Brandegee* 858; Stevens Pass, *Whited* 1466; Loomis, *Elmer* 568; Railroad Creek, *Elmer* 700; Kittitas County, *Sandberg & Leiberg* 703; Wind River, *Flett* 1088; Clealum Creek, *Cotton* 840.

Zonal distribution: Canadian.

6. Aster amethystinus Nutt. Trans. Am. Phil. Soc. **7**: 294. 1840.

Type locality. Salem and Cambridge, Massachusetts.

Range: Massachusetts to Iowa; eastern Oregon and eastern Washington.

Specimens examined: Okanogan River, *Watson* 191; Waitsburg, *Horner* 559; Wawawai, *Piper* 1602.

Zonal distribution. Arid Transition and Upper Sonoran.

7. Aster multiflorus Ait. Hort. Kew. **3**: 203. 1779.

Type locality: "North America."

Range. British Columbia to Canada, south to Arizona and Georgia

Specimens examined North Yakima, *Henderson*, October 5, 1892; Ellensburg, *Whited* 853, 591, Colville, *Lyall* in 1860; Loomis, *Elmer* 615, Lake Chelan, *Lake & Hull* 799; Spokane County, *Suksdorf* 930, Spokane, *Sandberg, Heller & McDougal* 917; Sprague, *Lake & Hull* August 4, 1892, without locality, *Lake & Hull* 798, without locality, *Vasey;* without locality, *Brandegee* 34, without locality, *Cooper* in 1853, Waitsburg, *Horner* 23, Toppenish, *Cotton* 774.

Zonal distribution: Upper Sonoran and Arid Transition.

8. **Aster oreganus** Nutt.; Torr. & Gr. Fl. **2**: 163. 1841.

Tripolium oreganum Nutt. Trans. Am. Phil. Soc. **7**: 296. 1840.

Type locality: "On the inundated banks of the Wahlamet," Oregon. Collected by Nuttall.

Range: Washington and Oregon.

Specimens examined: Falcon Valley, *Suksdorf* 63, 647, 396; Loomis, *Elmer* 614; Spokane, *Piper* 2377; without locality, *Vasey* 521; Kittitas County, *Cotton* in 1904.

Zonal distribution: Arid Transition.

9. **Aster hallii** A. Gray, Syn. Fl. 1^2: 191. 1884.

Type locality: Oregon. Collected by Hall.

Range: Washington and Oregon.

Specimens examined: Yakima region, *Brandegee* 860.

10. **Aster laevis geyeri** A. Gray, Syn. Fl. 1^2: 183. 1884.

Aster brevibracteatus Rydberg, Mem. N. Y. Bot. Gard. **1**: 393. 1900.

Type locality: "Meadows, Spokane and Columbia River valleys." Collected by Geyer, no. 638.

Range: Washington to Montana and Wyoming.

Specimens examined: Fort Colville, *Lyall* in 1860; Spokane County, *Suksdorf* 929; Spokane, *Piper* 2380, *Elmer* 868; Palouse, *Piper* 1783; Waitsburg, *Horner* 548; without locality, *Vasey*.

11. **Aster elmeri** Piper, Bull. Torr. Club **29**: 645. 1902.

Type locality: "Sinlahekin Basin near Loomis, Okanogan County, Wash." Collected by Elmer. Not otherwise known.

12. **Aster jessicae** Piper, Erythea **6**: 30. 1898.

Aster latahensis Henderson, Contr. Nat. Herb. **5**: 201. 1899.

Aster mollis Rydberg, Bull. Torr. Club **28**: 22. 1901.

Type locality: Pullman, Washington.

Range: Washington, Idaho, Wyoming.

Specimens examined: Pullman, *Piper*, August, 1898, 1604, 2663, May, 1898; Union Flat, *Piper* in 1900.

Zonal distribution: Arid Transition.

13. **Aster foliaceus** Lindl.; DC. Prod. **5**: 228. 1836.

Type locality: "In Unalaschka"

Range: Alaska to California and Nevada.

Specimens examined: North Yakima, *Watt*; Klickitat River, *Henderson*, August 13, 1892; Mount Adams, *Suksdorf* 67; without locality, *Vasey* 523.

Zonal distribution: Hudsonian.

13a. **Aster foliaceus frondeus** A. Gray, Syn. Fl. 1^2: 193. 1884.

Aster foliaceus burkei A. Gray, loc. cit.

Aster amplissimus Greene, Proc. Acad. Phila. **1895**: 550. 1895.

Type locality: Cascade Mountains, latitude 49°. Collected by Lyall.

Range: British Columbia to Oregon, Utah and Colorado

Specimens examined. Olympia, *Piper* 2197; *Flett* 811, Lake Cushman, *Henderson* 2041; Mount Stuart, *Elmer* 1201; Mount Adams, *Henderson* in 1882; *Suksdorf* 66, 642, August 12, 1885; Cascade Mountains, latitude 49°, *Lyall* in 1859; upper Nisqually Valley, *Allen* 283; Skagit Pass, *Lake & Hull* 694, Blue Mountains, *Piper* in 1896; Loomis, *Elmer* 581; without locality, *Brandegee* 856; Parson Creek, *Gorman* 828; Klickitat River, *Cotton* 1430.

Zonal distribution: Hudsonian.

13b. **Aster foliaceus apricus** A. Gray, Syn Fl. 1^2: 193. 1884.

Type locality: "High mountains of Colorado at Union Pass."

Range: Washington to Colorado.

Specimens examined: Mount Rainier, *Smith*, August 11, 1889; *Piper* 1071; Mount Adams, *Henderson*, August 3, 1892; *Suksdorf* 65; Yakima region, *Brandegee* 115, 852.

Zonal distribution: Hudsonian.

14. **Aster cusickii** A. Gray, Proc. Am. Acad. **16**: 99. 1881.

Type locality: "In the mountains of Union Co." Oregon. Collected by Cusick.

Range: Oregon and Washington in the Blue Mountains.

Specimens examined: Blue Mountains, *Horner* 363; Klickitat River, *Cotton* 1425, 1483.

Zonal distribution: Hudsonian.

The Cotton specimens are quite glabrous and perhaps a distinct species.

15. **Aster wattii** Piper, Bull. Torr. Club **29**: 645. 1902.

Type locality: "Near North Yakima, Wash." Collected by Prof. G. H. Watt; not otherwise known.

16. **Aster eatoni** (A. Gray) Howell, Fl. N. W. Am. 310. 1900.

Aster foliaceus eatoni A. Gray, Syn. Fl. 1^2: 194. 1884.

Type locality: "West Humboldt Mountains to the Wahsatch; 6–8000 feet elevation," Nevada.

Range: Washington to Utah and Nevada.

Specimens examined. Wenache, *Whited* 21, 199; Salmon River, *Horner* 361; Peshastin, *Sandberg & Leiberg*, August, 1893; Silver Lake, *Henderson*, July 3, 1892; Walla Walla, *Piper*, August 13, 1897; Waitsburg, *Horner* 547, 359; Toppenish, *Cotton* 776; Squaw Creek, *Cotton* 873.

Zonal distribution: Arid Transition and Upper Sonoran.

17. **Aster douglasii** Lindl ; Hook. Fl. Bor. Am. **2**: 11. 1834.

Type locality: "Common on the N. W coast, near the confluence of the Columbia, in open undulating grounds." Collected by Douglas.

Range: British Columbia to Idaho and California.

Specimens examined: Toppenish, *Henderson*, May 28, 1892; Fort Canby, *Savage* 27; Chelan, *Elmer* 849; Spokane, *Elmer* 866, 864; *Piper* 3801, 3802; *Kreager* 628; west Klickitat County, *Suksdorf* 191, 341, 342, 343, 344, 346; Peshastin, *Brandegee* 863.

Zonal distribution: Transition.

18. **Aster occidentalis** Nutt., Torr. & Gr. Fl. **2**: 164. 1841.

Tripolium occidentale Nutt. Trans. Am Phil. Soc **7**: 296. 1840.

Type locality: "By the margins of muddy ponds in the Rocky Mountains, 7,000 feet above the level of the sea." Collected by Nuttall.

Range: Washington, Oregon, and Idaho.

Specimens examined: Wenache, *Whited*.

18a. **Aster occidentalis intermedius** A. Gray, Syn. Fl. 1^2: 192. 1884

Type locality: Falcon Valley, Washington. Collected by Suksdorf.

Range: Washington to California.

Specimens examined: Peshastin, *Sandberg & Leiberg* 803, 807; Wind River, *Flett* 1070; Tampico, *Henderson*, July 31, 1892; Falcon Valley, *Suksdorf* 62; Klickitat, *Howell* 329, 557, west Klickitat County, *Suksdorf* 345; Yakima region, *Brandegee* 861; North Yakima, *Piper* 1782; Ellensburg, *Whited* 580, 529; Conconully, *Whited* 1319; Waitsburg, *Horner* 560, 551, 556; Almota, *Piper* 2731, 2373; without locality, *Vasey* 527; Clealum Lake, *Cotton* 864.

Zonal distribution: Upper Sonoran and Arid Transition

19. **Aster fremonti** (Torr. & Gr.) A. Gray, Syn. Fl 1^2: 191. 1884.

Aster adscendens fremonti Torr. & Gr. Fl. **2**: 503. 1843

Type locality. None given.

Range: British Columbia and Montana to California and Colorado.

Specimens examined: Cascade Mountains, *Lyall* in 1860; Peshastin, *Sandberg & Leiberg*, July, 1893; west Klickitat County, *Suksdorf* 640, 648, 649; Skamania County, *Suksdorf* 2169; Mount Adams, *Suksdorf* 339, 643; Falcon Valley, *Suksdorf* 340, 397; Yakima region, *Brandegee* 857; without locality, *Cusick* 1821; without locality, *Brandegee* 854, 855, 859; Spokane County, *Ramm*, July, 1893; Bingen, *Suksdorf* 2247; Spokane, *Piper* 2379; Pullman, *Piper* 1605; Waitsburg, *Horner*, August, 1896.

Zonal distribution: Arid Transition.

20. **Aster stenomeres** A. Gray, Proc. Am. Acad. **17**: 209. 1882.

Ionactis stenomeres Greene, Pittonia **3**: 246. 1897.

Type locality: "Rocky Mountains of Montana and Idaho, *Burke, Watson.*"

Range: Washington to Montana.

Specimens examined: Mount Carlton, *Kreager* 280.

Aster peregrinus Pursh. This is included in Gorman's list of the plants of the Washington Forest Reserve. An examination of the specimen in the National Herbarium shows the collection to be a mixture of *Erigeron salsuginosus* and *Aster foliaceus*.

Aster adscendens Lindl. is included in Suksdorf's list, but we question the identity of the specimens.

MACHAERANTHERA.

1. **Machaeranthera canescens** (Pursh) Greene, Pittonia **3**: 59. 1896.

Aster canescens Pursh, Fl. **2**: 547. 1814.

Type locality: "On the banks of the Missouri."

Range: Washington to Saskatchewan and Texas.

Specimens examined: Loomis, *Elmer* 608; Spokane, *Piper*, September, 1896.

Zonal distribution: Arid Transition.

1a. **Machaeranthera canescens viscosa** (Nutt.).

Dieteria viscosa Nutt. Trans. Am Phil. Soc. **7**: 301. 1840.

Aster canescens viscosus A. Gray, Syn. Fl. 1^1: 206. 1884.

Type locality: "Near Scott's Bluff, on the Platte." Collected by Nuttall.

Range: Washington to Wyoming and California.

Specimens examined: North Yakima, *Watt*, August, 1895; *Henderson*, October 5, 1892; Wenache, *Whited* 1331; Ellensburg, *Whited* 854; Rattlesnake Mountain, *Cotton* 478; Columbus, *Suksdorf*, June 10, 1886; Lake Chelan, *Lake & Hull*, August 16, 1892; near mouth of Okanogan, *Watson* 197; Coulee City, *Lake & Hull* 691; Colville, *Lyall* in 1860; Spokane, *Sandberg, Heller, & McDougal* 912; Waitsburg, *Horner* 555; Wawawai, *Piper* 1606; Almota, *Piper*, September, 1896.

Zonal distribution: Upper Sonoran.

MADIA. Tarweed.

Heads small, long-peduncled; disk-flower one .... 1. *M. exigua.*

Heads larger, sessile or short-peduncled; disk-flowers several.

Leaves all or mostly alternate; ligules small.

Rays 5 to 12; involucres campanulate.

Akenes of the rays broad; herbage lemon-scented .... 2. *M. citriodora.*

Akenes of the rays compressed; herbage heavy-scented.

Heads densely congested .... 4. *M. sativa.*

Heads loosely racemose .... 3. *M. racemosa.*

Rays 1 to 5, sometimes none; involucre laterally compressed; heads densely glomerate.

Stems glandular to the base; glomerules loosely cymose ... 5. *M. ramosa.*

Stems glandular above; glomerules racemose .... 6. *M. glomerata.*

Leaves all or mostly opposite; ligules large .... 7. *M. madioides.*

1. **Madia exigua** (Smith) Greene, Erythea **1**: 90. 1893.
Sclerocarpus exiguus Smith, Rees' Cycl. **31**: n. 3. 1816.
Harpaecarpus exiguus A. Gray, Bot. Mex. Bound. 101. 1859.
Madia filipes A. Gray, Proc. Am. Acad. **9**: 1874.
Harpaecarpus madarioides Nutt. Trans. Am. Phil. Soc. **7**: 389. 1840.

Type locality: "On the west coast of North America." Collected by Menzies.

Range: British Columbia to California and Idaho.

Specimens examined: San Juan Island, *Lyall* in 1858; Seattle, *Piper* 735; *Smith* 1069; Tacoma, *Flett* 140; Olympia, *Heller* 4045; west Klickitat County, *Suksdorf* 2139; Clealum, *Henderson*, June 11, 1892; Wenache, *Whited*, June, 1895 and 1132; junction Crab and Wilson creeks, *Sandberg & Leiberg* 272; Spokane, *Piper*, June 25, 1897; Pullman, *Piper* 1573; *Lake & Hull*, June 23, 1894; Waitsburg, *Horner* 172.

Zonal distribution. Transition.

1a. **Madia exigua macrocephala** (Suksdorf).
Madia filipes macrocephala Suksdorf, Deutsch. Bot. Monatss. **18**: 97. 1900.
Harpaecarpus exiguus macrocephalus Suksdorf, loc. cit.

Type locality: Bingen, Klickitat County, Wash.

Range: Washington.

Specimens examined: West Klickitat County, *Suksdorf*, June 18, 1892.

2. **Madia citriodora** Greene, Bull. Torr. Club **9**: 63. 1882.
Hemizonia citriodora A. Gray, Syn. Fl. 1^2: 307. 1884.

Type locality: Yreka, California.

Range: Washington to California.

Specimens examined: West Klickitat County, *Suksdorf* 370; Waitsburg, *Horner* 152, Bingen, *Sheldon* 10255; Wallula, *Cotton* 1071.

Zonal distribution: Arid Transition.

3. **Madia racemosa** (Nutt.) Torr. & Gr. Fl. **2**: 405. 1843.
Madorella racemosa Nutt. Trans. Am. Phil. Soc. **7**: 387. 1841.
Madia sativa racemosa A. Gray, Proc. Am. Acad. **9**: 189. 1874.
Madorella dissitiflora Nutt. loc. cit.
Madia dissitiflora Torr. & Gr. loc. cit.
Madia sativa dissitiflora A. Gray, loc. cit.

Type locality: "On the banks of the Oregon, near the estuary of the Wahlamet." Collected by Nuttall.

Range: British Columbia and Idaho to California.

Specimens examined: Fairhaven, *Piper;* Roslyn, *Whited* 470; Yakima region, *Brandegee* 897; Seattle, *Piper* 513; west Klickitat County, *Suksdorf* 2137, 2142; Vancouver, *Douglas*; Satsop, *Heller* 4029; Egbert Springs, *Sandberg & Leiberg*; Wenache, *Whited* 53; Ellensburg, *Whited* 684; *Elmer* 367; Clealum, *Henderson*; McAlisters Lake, *Henderson*; North Yakima, *Henderson;* Leavenworth, *Whited* 238; Peshastin, *Sandberg & Leiberg* 537; Alkali Lake, *Sandberg & Leiberg* 415; Pullman, *Piper* 1575, 3103; *Elmer* 902; Blue Mountains, *Piper* 2450; Wawawai, *Piper* 3061; Clarks Springs, *Kreager* 102; Tieton, *Cotton* 489; without locality, *Vasey* 545; Tukanon River, *Lake & Hull* 721.

Zonal distribution: Transition and Upper Sonoran.

4. **Madia sativa capitata** (Nutt.).
Madia capitata Nutt Trans. Am Phil. Soc. **7**: 386. 1841.
Madia sativa congesta Torr. & Gr. Fl. **2**: 101 1843.

Type locality: "In the plains of the Oregon towards the sea, particularly on Wappatoo Island." Collected by Nuttall.

Range. Washington to California in the coast region.

Specimens examined. Coupeville, *Gardner* 169; Seattle, *Suksdorf* 978.

Zonal distribution: Humid Transition.

5. **Madia ramosa** Piper, Bull. Torr. Club **29**: 222. 1902.
Type locality: "Blue Mts., Walla Walla County, Wash."
Range: Blue Mountains of Oregon and Washington.
Specimens examined: Blue Mountains, Columbia County, *Piper* 2451.

6. **Madia glomerata** Hook. Fl. Bor. Am. **2**: 24. 1834.
Amida gracilis Nutt. Trans. Am. Phil. Soc. **7**: 390. 1841.
Amida hirsuta Nutt. loc. cit.
Type locality: "Plains of the Saskatchewan." Collected by Drummond.
Range: British Columbia to Saskatchewan south to California and Colorado.
Specimens examined: Puyallup, *Piper*, September 2, 1899; Mount Stuart, *Elmer* 1098; Peshastin, *Sandberg & Leiberg* 805, 587; Yakima region, *Brandegee* 896; Falcon Valley, *Suksdorf* 414; Ellensburg, *Whited* 701; Pullman, *Piper* 1574; Waitsburg, *Horner* 172.
Zonal distribution: Arid Transition.

7. **Madia madioides** (Nutt.).
Anisocarpus madioides Nutt. Trans. Am. Phil. Soc. **7**: 388. 1841.
Madia nuttallii A. Gray, Proc. Am Acad **8**: 391. 1872.
Type locality. "Among rocks, in shady forests, at the mouth of the Wahlamet," Oregon Collected by Nuttall
Range: British Columbia to middle California in the coast region.
Specimens examined: Port Ludlow, *Binns*; Bellingham Bay, *Suksdorf* 977; Seattle, *Piper* 731, Tacoma, *Flett* 145, McAllisters Lake, *Henderson*, June 22, 1892.
Zonal distribution. Humid Transition.

HEMIZONELLA.

1. **Hemizonella durandi** A. Gray, Proc. Am Acad. **9**: 189. 1874.
Hemizonia durandi A Gray, Proc Am. Acad. **6**: 549. 1865.
Type locality Nevada County California.
Range. Washington to California in the coast region.
Specimens examined. Tacoma *Flett* 186; Steilacoom, *Piper* 373; Falcon Valley, *Suksdorf* 415, Mount Constitution, *Henderson* 2296; Easton, *Henderson* 2297.
Zonal distribution. Humid Transition.

HEMIZONIA.

1. **Hemizonia pungens** (Hook & Arn.) Torr. & Gr. Fl **2**: 399 1843.
Hartmannia pungens Hook & Arn Bot. Beech. Voy. 357. 1840.
Type locality California
Range: California Introduced in Washington.
Specimens examined. Tacoma, *Flett* 158, Frenchtown, *Nalder*, August 22, 1898; Walla Walla, *Blandford*, November 9, 1901. The species is doubtless introduced from California.

LAGOPHYLLA.

1 **Lagophylla ramosissima** Nutt Trans Am. Phil Soc **7**: 390 1841.
Type locality. "In the prairies near Walla Walla" Collected by Nuttall.
Range. Washington and Idaho to California
Specimens examined. North Yakima *Henderson*. May 25, 1892, White Salmon, *Suksdorf* 416. Crab and Wilson creeks *Sandberg & Leiberg* 253, Pullman, *Piper* 1576, *Lake & Hull* 746. Almota. *Lake & Hull* 746
Zonal distribution. Arid Transition and Upper Sonoran.

BLEPHARIPAPPUS.

1. **Blepharipappus glandulosus** Hook. Fl. Bor. Am. 1: 316. 1833.

Layia glandulosa Hook. & Arn. Bot. Beech. Voy. 358. 1840.

Type locality: "On the plains of the Columbia in sandy soils." Collected by Douglas.

Range: British Columbia to California and New Mexico.

Specimens examined: Yakima Mountains, *Mrs. Steinweg; Henderson* in 1891; Rockland, *Suksdorf* 284; Pasco, *Piper* 2955; *Hindshaw* 21; Sunnyside, *Cotton* 350; junction Crab and Wilson creeks, *Sandberg & Leiberg* 299; Wallula, *Cotton* 1038.

Zonal distribution: Arid Transition and Upper Sonoran.

Blepharipappus oreganus Greene, Pitttonia 2: 247. 1892. *Layia douglasii* Hook. & Arn. Bot. Beech. Voy. 358. 1841, not *Calliglossa douglassi* Hook. & Arn. op. cit. 356. Type locality: "On the gravelly islands of the Columbia between the Narrows and the Great Falls." Collected by Douglas. Not since found. We incline to the view of Dr. Gray, that this is merely an aberrant form of *B. glandulosus* Hook. with stouter and nearly naked pappus bristles. In other characters it can not be distinguished.

PTILONELLA.

1. **Ptilonella scabra** (Hook.) Nutt. Trans. Am. Phil. Soc. 7: 386. 1841.

Blepharipappus scaber Hook. Fl. Bor. Am. 1: 316. 1833.

Type locality: "Sandy plains of the Columbia." Collected by Douglas.

Range: Washington and Idaho to California and Nevada.

Specimens examined: Rock Lake, *Sandberg & Leiberg* 119; Spokane, *Wilkes Expedition;* Spangle, *Piper* 2876; Tukanon River, Blue Mountains, *Lake & Hull* 723.

Zonal distribution: Arid Transition.

BIDENS. Beggar ticks.

Plant aquatic; submerged leaves capillary .... 3. *B. beckii.*
Plants terrestrial.
  Rays none; leaves pinnately 3 to 5-divided .... 1. *B. vulgata.*
  Rays conspicuous; leaves lanceolate, serrate .... 2. *B. cernua.*

1. **Bidens vulgata** Greene, Pittonia 4: 72. 1899.

Type locality: None given.

Range: Washington to New York south to California and Virginia.

Specimens examined: West Klickitat County, *Suksdorf* 1591, 412; North Yakima, *Watt*, August, 1895; Loomiston, *Elmer* 611; Rock Lake, *Lake & Hull*, August 3, 1892; Spokane, *Henderson*, July 10, 1892; Wawawai, *Piper* 1863. Chewelah, *Kreager* 527; without locality, *Brandegee* 895

Zonal distribution: Upper Sonoran and Arid Transition.

2. **Bidens cernua** L. Sp. Pl. 2: 832. 1753.

Bidens cernua elliptica Wiegand Bull Torr. Club 26: 417. 1899.

Bidens lonchophylla Greene, Pittonia 4: 258. 1901.

Bidens macounii Greene, loc. cit.

Type locality: "Habitat in Europa ad fontes & fossas."

Range: British Columbia to Labrador south to California and North Carolina. Europe. Asia

Specimens examined: Coupeville, *Gardner* 148, Ilwaco, *Henderson*, September 7, 1892; Tacoma, *Flett* 157. Ellensburg, *Whited* 592, Puyallup, *Piper*, September 2, 1899; Spokane, *Piper;* Falcon Valley, *Suksdorf* 1592; Sumas, *Lyall;* Spangle, *Suksdorf* 932; Waitsburg, *Horner* 22, 333; Newport, *Piper* 4210; Kittitas County, *Cotton* 1763.

Prof. E. L. Greene considers that the American plants generally referred to *Bidens cernua* represent not less than 13 species. The distinctions relied upon seem very slight. The western Washington specimens apparently are all referable to *B. macounii*, while most of the eastern Washington plants belong to *B. lonchophylla*.

One of these Washington forms was mistaken for *Bidens chrysanthemoides* by Hooker, Fl. Bor. Am. 1: 314. 1834.

3. **Bidens beckii** Torr.; Spreng. Neu. Entd. 2: 135. 1821.

Megalodonta remota Greene, Pittonia 4: 272. 1901.

Type locality: Near Schenectady, New York.

Range: Washington, Manitoba, and Quebec to Missouri and New Jersey.

Specimens examined: Seattle, *Piper* in 1890; Davis Lake, *Kreager* 442.

Bidens dentata (Nutt.) Wiegand, Bull. Torr. Club **26**: 412. 1899. *Bidens quadriaristata dentata* Nutt. Trans. Am. Phil. Soc. 7: 368. 1841. *Bidens cernua elata* Torr. & Gr. Fl. 2: 352. 1842. Type locality: "Wappatoo Island, at the outlet of the Wahlamet, Oregon." There is much doubt about the identity of this plant, which may perhaps be cleared up by collecting new material at the type locality.

COREOPSIS.

1. **Coreopsis atkinsoniana** Dougl.; Lindl. Bot. Reg. **16**: *pl. 1376*. 1830.

Calliopsis atkinsoniana Hook. Fl. Bor. Am. 1: 311. 1833.

Type locality: "Mewries [Menzies?] Island, in the river Columbia." Collected by Douglas.

Range: British Columbia to Oregon and Idaho.

Specimens examined: Fort Vancouver, *Tolmie; Douglas;* Wenache, *Whited* 1150; Cascades to Colville, *Lyall* in 1860; mouth of Chelan River, *Watson* 217; Old Fort Colville, *Watson;* Chelan Falls, *Lake & Hull* 748; Loomis, *Elmer* 601; head of Grand Coulee, *McKay*, 25; Spokane, *Henderson*, July 9, 1892; without locality, *Vasey* 551; Lake Kalispel, *Kreager* 315.

Zonal distribution: Arid Transition.

RUDBECKIA. Cone flower.

Leaves oblong-lanceolate, hispid or hirsute.......................... 1. *R. hirta*.
Leaves ovate or ovate-lanceolate.
  Glabrous or nearly so, somewhat glaucous; leaves entire or dentate. 2. *R. occidentalis*.
  Pubescent; leaves mostly 3 to 5-parted toward the base .... 3. *R. alpicola*.

1. **Rudbeckia hirta** L. Sp. Pl. 2: 907. 1753.

Type locality: "In Virginia, Canada."

Range: Saskatchewan and Canada to Colorado, Texas, and Florida. Introduced in Washington.

Specimens examined: Whidby Island, *Gardner* 151; Tacoma, *Flett* 122; Snoqualmie, *Miss Parker*, July, 1892.

Introduced from the eastern States.

2. **Rudbeckia occidentalis** Nutt. Trans. Am. Phil. Soc. 7: 355. 1840.

Type locality: "Rocky Mountains and woods of the Oregon, particularly in the Blue Mountain range." Collected by Nuttall.

Range: Washington to Montana and California.

Specimens examined: Marshall Junction, *Piper*, July 2, 1896; Spokane County, *Suksdorf* 356; Blue Mountains, Columbia County, *Piper*, July 20, 1896.

Zonal distribution: Arid Transition and Canadian.

3. **Rudbeckia alpicola** Piper, Erythea 7: 173. 1899.

TYPE LOCALITY: Mount Stuart, Washington. Collected by Elmer.

RANGE: Cascade Mountains, Washington.

SPECIMENS EXAMINED: Mount Stuart, *Elmer* 1171; *Sandberg & Leiberg* 578; Wenache Mountains, *Whited* 1417.

BALSAMORHIZA.

- Ligules persisting: akenes canescent .... 1. *B. careyana.*
- Ligules deciduous: akenes glabrous.
  - Leaves entire or merely dentate.
    - Herbage silvery-canescent: involucre woolly .... 2. *B. sagittata.*
    - Herbage green: involucre not woolly .... 3. *B. deltoidea.*
  - Leaves pinnately cleft, parted, or divided.
    - Herbage canescent; involucre puberulent to lanate .... 4. *B. balsamorhiza.*
    - Herbage green.
      - Leaves deltoid, usually laciniate, but varying to coarsely dentate or rarely entire; involucre more or less woolly. 5. *B. terebinthacea.*
      - Leaves parted into numerous segments, hirsute; involucre hirsute, rarely woolly .... 6. *B. hirsuta.*

1. **Balsamorhiza careyana** A. Gray, Pl. Fendl. 81. 1849.

TYPE LOCALITY: Idaho. "Sandy plains, Clear Water, on the Kooskooskie." Collected by Spalding.

RANGE: Eastern Washington, Eastern Oregon, and perhaps adjacent Idaho.

SPECIMENS EXAMINED. Ritzville, *Sandberg & Leiberg* 166; Sprague, *Sandberg & Leiberg*, June, 1893; Ephrata to Ritzville, *Griffiths & Cotton* 483; Prosser to Rattlesnake Mountains, *Griffiths & Cotton* 10; Wallula, *Cotton* 1052; Delight, *Cotton* 1004; Washtucna, *Cotton* 976; Prosser, *Cotton* 1084, 1105; Walla Walla region, *Brandegee* 891.

ZONAL DISTRIBUTION: Upper Sonoran.

This species has not since been found near Lapwai, Spalding's "Clearwater" locality. It is, however, abundant on the lower parts of Snake River and the type may have there been gathered, as some of Spalding's specimens were collected "60 miles west of Clearwater."

2. **Balsamorhiza sagittata** (Pursh) Nutt. Trans. Am. Phil. Soc. 7: 350. 1840.

Buphthalmum sagittatum Pursh, Fl. 2: 564. 1814.

Espeletia sagittata Nutt. Journ. Acad. Phila. 7: 38. 1834.

Espeletia helianthoides Nutt. Journ. Acad. Phila 7: 39. 1834.

Balsamorhiza helianthoides Nutt. Trans. Am. Phil. Soc. 7: 351. 1840.

TYPE LOCALITY: "On dry barren hills in the Rocky Mountains." Collected by Lewis. The exact place is Lewis and Clark Pass, Montana.

RANGE: British Columbia and Montana to California and Colorado.

SPECIMENS EXAMINED: Colville, *Lyall* in 1861; Spokane County, *Suksdorf* 366; *Sandberg & Leiberg* 23; Spokane, *Henderson*, May 3, 1892, Flathead River, *Wyeth*; Pullman, *Elmer* 828, *Piper* 1594; without locality, *Vasey* 196. Rock Creek, *Cotton* 961; Wenache Mountains, *Piper* 2668, apparently a hybrid between *deltoidea* and *sagittata*, with which it occurred

ZONAL DISTRIBUTION. Arid Transition.

3. **Balsamorhiza deltoidea** Nutt Trans. Am. Phil Soc. 7: 351 1840.

TYPE LOCALITY. "Outlet of the Wahlamet, in wet open places," Oregon. Collected by Nuttall.

RANGE: British Columbia to Idaho and California.

SPECIMENS EXAMINED: Whidby Island near Coupeville, *Gardner* 180; Lake Park, *Piper*. July 27, 1895, Tacoma, *Flett* 43; Vancouver, *Piper* 4945; Nisqually, *Wilkes Expedition*;

Yakima, *Mrs. Steinweg*; *Leckenby*, April 22, 1896; Mount Stuart, *Sandberg & Leiberg* 573; without locality, *Vasey* in 1889; Umtanum Creek, *Cotton* 1140.

The typical plant occurs only west of the Cascade Mountains, and has broad, deeply cordate, usually crenate-dentate leaves, while in the Eastern Washington plant the leaves are longer and narrow, entire or nearly so, and but little cordate. Perhaps two species may be involved.

ZONAL DISTRIBUTION: Transition.

4. **Balsamorhiza balsomorhiza** (Hook.) Heller, Cat. N. A. Pl. 7. 1898.

Heliopsis? balsamorhiza Hook Fl. Bor. Am. **1**: 310. 1833.

Balsamorhiza hookeri Nutt. Trans. Am. Phil. Soc. **7**: 349. 1840.

TYPE LOCALITY: "Common on the gravelly banks of the Columbia near Fort Vancouver." Collected by Douglas.

RANGE: Washington to Utah and California.

SPECIMENS EXAMINED: Falcon Valley, *Suksdorf* 357, 358; Klickitat River, *Suksdorf* 359; Simcoe Mountains, *Howell;* Rattlesnake Mountains, *Cotton* 568; Mill Plain near Vancouver, *Howell*, June 4, 1880.

ZONAL DISTRIBUTION: Transition.

5. **Balsamorhiza terebinthacea** (Hook.) Nutt. Trans. Am. Phil. Soc. **7**: 349. 1840.

Heliopsis terebinthacea Hook Fl. Bor Am **1**: 310. 1833.

TYPE LOCALITY: "Common at Fort Vancouver on the Columbia and in the grounds of the interior." Collected by Douglas.

RANGE. Washington, Idaho, and Oregon.

SPECIMENS EXAMINED. Falcon Valley, *Suksdorf* 869, 363, 135; Rock Island, *Sandberg & Leiberg* 460; Klickitat River, *Suksdorf* 360, 362, 361; Ellensburg, *Piper*, May 20, 1897; 60 miles west of Clearwater *Spalding*.

ZONAL DISTRIBUTION: Transition.

6. **Balsamorhiza hirsuta** Nutt. Trans. Am. Phil. Soc. **7**: 349. 1840.

TYPE LOCALITY: "Dry plains east of Walla Walla, near the Blue Mountains, and in the Grande Ronde prairie." Collected by Nuttall.

RANGE: British Columbia to Utah and California.

SPECIMENS EXAMINED Wenache Mountains, *Elmer* 476; *Whited* 1354½; Wenache, *Whited* 6, 1354, Ellensburg, *Piper* 2718, May 20, 1897, Cleman Mountain, *Henderson*, June 14, 1892; Coulee City *Piper* 3853; Waterville *Whited* 1219; "Wallah Wallah," *Nuttall?*, without locality *Vasey* in 1889, Wenache Mountains, *Cotton* 1193; Spipen [Naches] River, *Wilkes Expedition*.

ZONAL DISTRIBUTION: Transition.

WYETHIA.

Leaves lance-oblong, glabrous, varnished .... 1. *W. amplexicaulis*.
Leaves lanceolate, sparsely hirsute .... 2. *W. angustifolia*.

1. **Wyethia amplexicaulis** Nutt Trans Am. Phil Soc. **7**: 352. 1840.

Espeletia amplexicaulis Nutt. Journ. Acad Phila **7**: 38. 1834.

TYPE LOCALITY. "About Flat-head River." Collected by Wyeth.

RANGE: British Columbia and Montana to Nevada and California.

SPECIMENS EXAMINED. Columbia River latitude 46° to 49°, *Lyall;* White Salmon, *Suksdorf;* Peshastin, *Sandberg & Leiberg* 532; Pullman, *Lake & Hull* 750; *Piper* 1595; without locality, *Vasey* 497, Wenache Mountains, *Griffiths & Cotton* 113.

ZONAL DISTRIBUTION. Arid Transition.

2. **Wyethia angustifolia** (DC.) Nutt. Trans. Am. Phil. Soc. **7**: 352. 1840.

Helianthus longifolius Hook. Fl. Bor. Am. **1**: 312. 1834, not Pursh, 1814.

Alarconia angustifolia DC Prod. **5**: 537. 1836.

Helianthus hookerianus DC. Prod. **5**: 590. 1836.
Wyethia robusta Nutt. Trans. Am. Phil. Soc. **7**: 352. 1840.
TYPE LOCALITY: "In California." Collected by Douglas.
RANGE: Washington to California.
SPECIMENS EXAMINED: West Klickitat County, *Suksdorf* 129.
ZONAL DISTRIBUTION: Humid Transition.

HELIANTHELLA.

1. Helianthella douglasii Torr. & Gr. Fl. N. Am. **2**: 334. 1842.

TYPE LOCALITY: "Common on the subalpine ranges of the Blue Mountains." Collected by Douglas.

RANGE: British Columbia to Idaho and Oregon.

SPECIMENS EXAMINED: Ellensburg, *Whited* 663; Wenache, *Whited* 154, 1138; Yakima Region, *Brandegee* 894; Peshastin, *Sandberg & Leiberg* 486; without locality, *Vasey* 502; Spokane County, *Suksdorf* 367; Pullman, *Piper* 1598; *Lake & Hull* 751; Moxee, *Griffiths & Cotton* 30.

ZONAL DISTRIBUTION: Arid Transition.

HELIANTHELLA UNIFLORA Torr. & Gr. is not known definitely from Washington, but specimens of *H. douglasii* have sometimes been mistaken for it.

HELIANTHUS. SUNFLOWER.

Annual; disk flowers dark.. 1. *H. annuus.*
Perennial; disk flowers yellow; involucral bracts ciliate.................. 2. *H. cusickii.*

1. Helianthus annuus L. Sp. Pl. **2**: 904. 1753.

Helianthus lenticularis Dougl.; Lindl. Bot. Reg. **15**: *t. 1265.* 1829.

TYPE LOCALITY: "In Peru, Mexico."

RANGE: Washington to Saskatchewan south to Texas and California. Mexico.

SPECIMENS EXAMINED: Wenache, *Whited* 1088; Rock Island, *Sandberg & Leiberg* 462; Coulee City, *Henderson*, July 11, 1892; without locality, *Vasey* 499; Fresh Lake, *McKay* 14; Wawawai, *Piper* 1597; Almota, *Piper*, August 26, 1894; Marcus, *Kreager* 462.

ZONAL DISTRIBUTION: Upper Sonoran.

2. Helianthus cusickii A. Gray, Proc. Am. Acad. **21**: 413. 1886.

TYPE LOCALITY: Malheur River, Oregon. Collected by Cusick.

RANGE: Eastern Washington and Eastern Oregon.

SPECIMENS EXAMINED: Morgans Ferry, *Suksdorf* 368. Columbia River, *Howell;* Tampico, *Flett* 1182; Snipes Mountain, *Cotton* 378; North Yakima, *Brandegee; Henderson* in 1892; *Steinweg*, *Watt* in 1895; Yakima, *Piper* 1825; *Leckenby*.

ZONAL DISTRIBUTION: Upper Sonoran.

HELIANTHUS NUTTALLII Torr. & Gr. in Suksdorf's list is based on specimens that are really *H. cusickii.*

JAUMEA.

1. Jaumea carnosa (Less.) A. Gray in Torr. Bot. Wilkes Exped 360. 1874.

Coinogyne carnosa Less. Linnaea **6**: 521 1831.

TYPE LOCALITY: California.

RANGE: Seacoasts, Washington to California.

SPECIMENS EXAMINED: Shoalwater Bay, *Cooper; Henderson;* Whidby Island, *Gardner* 425, 152; Port Townsend, *Edwards* in 1896; Tacoma, *Flett* 102, Union City, *Piper* in 1890.

ZONAL DISTRIBUTION: Humid Transition.

ERIOPHYLLUM.

Akenes glandular	1. *E. multiflorum.*
Akenes not glandular	2. *E. lanatum.*

1. **Eriophyllum multiflorum** (Nutt.) Rydberg, Mem. N. Y. Bot. Gard. **1**: 422. 1900.

Trichophyllum multiflorum Nutt. Journ. Acad. Phila. **7**: 35. 1834.

Bahia gracilis Hook. & Arn. Bot. Beech. Voy. 353. 1840.

Eriophyllum gracile A. Gray, Proc. Am. Acad. **19**: 26. 1883.

Type locality: "In the valleys of the Rocky Mountains towards the sources of the Missouri." Collected by Wyeth.

Range: Washington, Oregon, and Idaho.

Specimens examined: Mount Stuart, *Brandegee* 905; North Yakima, *Watt* in 1895; *Mrs. Steinweg; Henderson* 2292; Yakima Region, *Brandegee* 904; Ellensburg, *Piper*; *Whited* 493; Thorp, *Whited* 633; Rattlesnake Mountains, *Cotton* 405; White Bluffs, *Suksdorf* 372; Coulee City, *Piper* 3857; Ritzville, *Sandberg & Leiberg* 183; Lake Chelan, *Lake & Hull* 802; Moses Coulee, *Lake & Hull;* without locality, *Vasey* 492, 493; Spokane, *Piper;* Snake country, *Tolmie.*

Zonal distribution: Upper Sonoran.

2. **Eriophyllum lanatum** (Pursh) Forbes, Hort. Woburn. 183. 1838.

Actinella lanata Pursh, Fl. **2**: 560. 1814.

Eriophyllum caespitosum Dougl.; Lindl. Bot. Reg. **14**: *t. 1167.* 1828.

Type locality: "On the highlands of the Kooskoosky." Collected by Lewis, the exact spot opposite Kamiah, Idaho.

Range: British Columbia and Montana to California.

Specimens examined: Mason County, *Piper* 515; Olympic Mountains, *Piper* 2193; Lake Park, *Piper*, July 27, 1895; Skokomish River, *Kincaid*, June 15, 1892; Bellingham Bay, *Henderson*, July 2, 1892; Fairhaven, *Piper* 2802; Salmon River, *Horner* 340; Roslyn, *Whited* 410; Fourth Plain, *Piper*, July 10, 1897; Wawawai, *Piper*, June 9, 1894; *Lake & Hull* 801; Vancouver, *Piper* 4932.

Zonal distribution: Transition.

HULSEA.

1. **Hulsea nana** A. Gray, Pac. R. Rep. **6**: 76. 1855.

Type locality: "Crater Pass, Cascade Mountains, 44° 10′," Oregon. Collected by Newberry.

Range: Washington and Idaho to California.

Specimens examined: Mount Rainier, *Piper* 2153; *Allen* 227; Mount Adams, *Henderson*, August 10, 1892; *Flett* 1075; *Suksdorf* in 1878.

Zonal distribution: Arctic.

RIGIOPAPPUS.

1. **Rigiopappus leptocladus** A. Gray, Proc. Am. Acad. **6**: 548. 1865.

Type locality: "Dalles of the Columbia River." Collected by Lyall.

Range: Washington to California.

Specimens examined: Klickitat County, *Suksdorf;* Wenache, *Whited* 1128; foothills Blue Mountains, *Horner* 142; Wawawai, *Elmer* 768; *Piper* 1780.

Zonal distribution: Upper Sonoran and Arid Transition.

CHAENACTIS.

Heads corymbose	1. *C. douglasii.*
Heads solitary; alpine dwarf	2. *C. nevadensis.*

1. **Chaenactis douglasii** (Hook.) Hook. & Arn. Bot. Beech. Voy. 354. 1840.

Hymenopappus douglasii Hook. Fl. Bor. Am. **1**: 316. 1833.

TYPE LOCALITY: "In the barren grounds of the Columbia from the Great Falls to the Rocky Mountains." Collected by Douglas.

RANGE: Washington and Montana to California and New Mexico.

SPECIMENS EXAMINED: North Yakima, *Watt*, August, 1895; *Leckenby*, May 10, 1898; Yakima, *Henderson*, May 25, 1892; Wenache, *Whited* 167, 1126; Snipes Mountain, *Cotton* 497; Crab and Wilson creeks, *Sandberg & Leiberg* 295; Soap Lake, *McKay* 10; Spokane, *Piper*, July 2, 1896; *Geyer* 142; *Henderson*, July 9, 1892; Wawawai, *Elmer 897*; *Lake & Hull* 800; Blue Mountains, *Horner* 347; Clarks Springs, *Kreager* 92; Marcus, *Kreager* 457.

ZONAL DISTRIBUTION: Upper Sonoran.

2. **Chaenactis nevadensis** (Kellogg) A. Gray, Bot. Cal. 1: 391. 1876.

Hymenopappus nevadensis Kellogg, Proc. Cal. Acad. 5: 46. 1873.

TYPE LOCALITY: None given, but presumably the Sierra Nevada Mountains, California.

RANGE: Washington to Nevada.

SPECIMENS EXAMINED: Near Mount Stuart, *Brandegee* 906.

GAILLARDIA.

1. **Gaillardia aristata** Pursh, Fl. 2: 573. 1814.

TYPE LOCALITY: "Rocky Mountains." Collected by Lewis in Lewis and Clark Pass, Montana.

RANGE: British Columbia to Saskatchewan south to California and New Mexico.

SPECIMENS EXAMINED: Fort Vancouver, *Tolmie*; Rock Island, *Sandberg & Leiberg* 438; Parker, *Cotton* 434; west Klickitat County, *Suksdorf* 979, 191; North Yakima, *Watt*, August, 1895; *Henderson*, May 29, 1892; Wenache, *Whited* 1117, June and July, 1896; Pasco, *Hindshaw* 12, between Coulee City and Waterville, *Spillman*, May, 1896; Loon Lake, *Winston*, July 20, 1897; Old Fort Colville, *Watson* 224; Spokane, *Watson* 223; Pullman, *Piper* 1599; Illia, *Lake & Hull* 729; without locality, *Vasey* 501; Clarks Springs, *Kreager* 26; Lake Kalispel, *Kreager* 326.

ZONAL DISTRIBUTION: Arid Transition and Upper Sonoran.

HYMENOPAPPUS.

1. **Hymenopappus filifolius** Hook. Fl. Bor. Am. 1: 317. 1833.

TYPE LOCALITY: "On the undulating arid grounds of the Columbia, near the Wallawallah and on the banks of the Spokan and Flathead rivers." Collected by Douglas.

RANGE: Eastern Washington, Eastern Oregon, and Idaho.

SPECIMENS EXAMINED: Morgans Ferry, *Suksdorf* 373; Moses Lake, *Sandberg & Leiberg* 375; Walla Walla region, *Brandegee* 903; Sentinel Bluffs, *Cotton* 1366.

ZONAL DISTRIBUTION: Upper Sonoran.

HELENIUM.

1. **Helenium autumnale grandiflorum** (Nutt.) A. Gray, Syn. Fl. 1^2: 349. 1884.

Helenium grandiflorum Nutt. Trans. Am. Phil. Soc. 7: 381. 1840.

TYPE LOCALITY: "Banks of the Oregon and Wahlamet" Collected by Nuttall.

RANGE: British Columbia to Idaho and Oregon.

SPECIMENS EXAMINED: West Klickitat County, *Suksdorf* 191, Centralia, *Piper*, September, 1895; Sumas Prairie, *Lyall* in 1858-9; Cascades to Colville, *Lyall* in 1860; Wawawai, *Piper*, October, 1895; Almota, *Piper*, August 26, 1894.

ZONAL DISTRIBUTION: Transition.

ACHILLEA.

1. **Achillea millefolium lanulosa** (Nutt.) Piper, Fl. Palouse Reg. 196. 1901. YARROW.

Achillea lanulosa Nutt. Journ. Acad Phila. 7. 36 1834

? *Achillea millefolium occidentale* DC Prod. 6: 24. 1837.

TYPE LOCALITY: Rocky Mountains. Collected by Wyeth.

RANGE: British Columbia to Manitoba south to Mexico.

SPECIMENS EXAMINED: Port Crescent, *Lawrence* 266; Everett, *Piper* 4986; Mount Adams, *Suksdorf* 1606; Mount Rainier, *Piper*, August, 1895; *Smith; Allen; Tolmie;* Crab and Wilson creeks, *Sandberg & Leiberg* 286; Loon Lake, *Winston*, July 20, 1897; Kamiak Butte, *Piper*, July 20, 1899; Wawawai, *Lake & Hull* 804; Spokane, *Kreager* 7.

ZONAL DISTRIBUTION: Transition to Hudsonian.

The form of this species which grows near the seacoast is much greener and may perhaps better be referred to typical *A. millefolium* L. Alpine forms are much reduced in stature, but we believe that none of the Washington specimens can properly be referred to *A. borealis* Bong.

ANTHEMIS.

Rays yellow; leaves somewhat tomentose .... 1. *A. tinctoria.*
Rays white.
  Leaves glabrous, ill-scented; rays neutral .... 2. *A. cotula.*
  Leaves pubescent, not ill-scented; rays fertile .... 3. *A. arvensis.*

1. **Anthemis tinctoria** L. Sp. Pl. **2**: 896. 1753.

TYPE LOCALITY: "Habitat in Succiae, Germaniae apricis pratis siccis."

SPECIMENS EXAMINED: Lake Park, Pierce County, *Piper*.

2. **Anthemis cotula** L. Sp. Pl. **2**: 894. 1753.

Maruta cotula DC. Prod. **6**: 13. 1837. MAYWEED.

TYPE LOCALITY: "Habitat in Europae ruderatis praecipue in Ucrania."

SPECIMENS EXAMINED: Pullman, *Piper*, July 29, 1899.

3. **Anthemis arvensis** L. Sp. Pl. **2**: 894. 1753.

TYPE LOCALITY: "Habitat in Europae praesertim Surerae agris."

SPECIMENS EXAMINED: Olympia, *Henderson* 2293; West Klickitat County, *Suksdorf* 139; Fort Canby, *Savage* August 13, 1898.

CHRYSANTHEMUM.

Heads solitary, large; leaves pinnatifid .... 1. *C. leucanthemum.*
Heads corymbed, smaller; leaves bipinnatifid .... 2. *C. parthenium.*

1. **Chrysanthemum leucanthemum subpinnatifidum** Fernald, Rhodora **5**: 181. 1903.

OXEYE DAISY.

The oxeye daisy is a common weed in a few localities in western Washington. According to Hooker it was collected by Douglas at Fort Vancouver as early as 1825.

2. **Chrysanthemum parthenium** (L.) Pers. Syn. **2**: 462. 1807. FEVERFEW.

Matricaria parthenium L. Sp. Pl. **2**: 890. 1753.

TYPE LOCALITY: European.

This has been collected as a garden escape at Waitsburg by *Horner*, and it is reported from west Klickitat County by *Suksdorf*.

MATRICARIA.

1. **Matricaria matricarioides** (Less.) Porter, Mem. Torr. Club **5**: 341. 1894.

Artemisia matricarioides Less. Linnaea **6**: 210. 1831.

Matricaria discoidea DC. Prod. **6**: 50. 1837.

TYPE LOCALITY: Unalaschka.

RANGE: Alaska to California and Montana.

SPECIMENS EXAMINED: Seattle, *Piper* in 1892; Silverton, *Bouck* 112a; Pullman, *Piper* 1588; Big Meadows, *Kreager* 432.

ZONAL DISTRIBUTION: Transition.

MATRICARIA CHAMOMILLA L., the garden chamomile, is reported from Klickitat County as an escape by Suksdorf.

COTULA.

1. **Cotula coronopifolia** L. Sp. Pl. **2**: 892. 1753.

TYPE LOCALITY: "In Aethiopia."

RANGE: Washington to California, introduced from South Africa.

SPECIMENS EXAMINED: Hoquiam, *Lamb* 1223; Port Angeles, *Piper*, September 1, 1895; *Grant* in 1889; Tacoma, *Flett* 127; Charleston, *Piper*, July 21, 1895; Southbend, *Spillman*.

This plant has been abundant in brackish marshes along the seacoast of Washington for twenty years or more, and gives one the impression of being native.

TANACETUM.

1. **Tanacetum huronense** Nutt. Gen. **2**: 141. 1818.

Tanacetum douglasii DC. Prod. **6**: 128. 1837.

TYPE LOCALITY: "Lake Huron near Michilimackinack."

RANGE: Washington and Oregon on the seacoast, the Great Lakes, Maine and New Brunswick.

SPECIMENS EXAMINED: Grays Harbor, *Lamb* 1217; without locality, *Cooper*; Ilwaco, *Piper*.

ZONAL DISTRIBUTION: Humid Transition.

TANACETUM VULGARE L., the garden tansy, is found occasionally as an escape from gardens.

ARTEMISIA. SAGEBRUSH. WORMWOOD.

- Herbaceous or suffrutescent.
  - Disk flowers perfect but sterile; marginal flowers pistillate.
    - Leaves linear, mostly entire, glabrous.................. 1. *A. dracunculoides.*
    - Leaves pinnately or bipinnately divided into narrow lobes.
      - Heads very numerous, small, greenish............ 2. A. *canadensis.*
      - Heads rather few, large, brownish; alpine .... 3. *A. borealis.*
  - Disk flowers perfect, fertile; marginal flowers pistillate.
    - Receptacle pilose.
      - Leaves silvery pubescent, the short segments filiform...................................... 4. *A. frigida.*
      - Leaves not silvery, the segments oblong or oblong-linear..................................... 17. *A. absinthium.*
    - Receptacle not pilose.
      - Leaves green, finely dissected into linear segments.
        - Biennial; heads small, in leafy panicles....... 5. *A. biennis.*
        - Perennial; heads few, large.................. 6. *A. longepedunculata.*
      - Leaves white beneath, not finely dissected.
        - Involucre persistently white tomentose.
          - Leaves not glandular puncticulate........ 7. *A. ludoviciana.*
          - Leaves puncticulate with scattered glandular dots........................... 8. *A. atomifera.*
        - Involucre green, glabrous or pubescent; not tomentose.
          - Heads campanulate.
            - Leaves pinnately or bipinnately divided into narrow segments....... 10. *A. discolor.*
            - Leaves lanceolate-oblong, entire or more or less laciniately cleft.
              - Stem about 1 m. high; leaves persistently tomentose beneath; involucre green....... 9. *A. tilesii.*

Stems 30 to 60 cm., slender; leaves very narrow; involucre fuscous .... 11. *A. lindleyana.*
Heads cylindric; leaves lanceolate-oblong, sparingly cleft or entire .... 12. *A. suksdorfii.*
Shrubs; flowers all perfect and fertile.
  Tall, .5 to 2 m. high; leaves mostly 3-toothed............. 13. *A. tridentata.*
  Less tall, 30 to 60 cm. high; leaves lobed cleft or parted.
    Leaves 3 to 5-lobed, the lobes cuneate-obovate......... 14. *A. arbuscula.*
    Leaves 3 to 5-cleft or parted, the lobes linear.
      Panicle spike-like, the heads mostly solitary in the axils of ordinary leaves .... 15. *A. rigida.*
      Panicle thyrsoid; heads clustered.................. 16. *A. tripartita.*

1. Artemisia dracunculoides Pursh, Fl. **2**: 521. 1814.
Artemisia cernua Nutt. Gen. **2**: 143. 1818.
Artemisia inodora Hook. & Arn. Bot. Beech. Voy. 150. 1833.

Type locality: "On the Missouri." Collected by Lewis; the exact place near the mouth of White River, Lyman Co., S. Dak.

Range: British Columbia to Sashatchewan, south to California and Texas.

Specimens examined: West Klickitat County, *Suksdorf* 1609; Wenache, *Whited* 1337; North Yakima, *Henderson*, October 5, 1892; Peshastin, *Sandberg & Leiberg* 829; Loomis, *Elmer* 598; Spokane, *Piper*, August, 1893; *Sandberg, Heller, & McDougal* 908; Wawawai, *Piper* 1587.

Zonal distribution: Upper Sonoran.

2. Artemisia canadensis Michx. Fl. **2**: 128. 1804.
?*Artemisia pacifica* Nutt. Trans. Am. Phil. Soc. **7**: 401. 1841.

Type locality: Hudson Bay.

Range: Washington to Hudson Bay, south to New England and in the Rocky Mountains to Arizona.

Specimens examined: Whidby Island, *Gardner* 164; Skamania County, *Suksdorf* 659; Wenatchee, *Whited* 29.

Zonal distribution: Transition.

3. Artemisia borealis wormskioldii Besser, Dracunc. 83. 1832.

Type locality: "In rupibus sinus Kabssund Groenlandiae."

Range: Alaska to Greenland, south to Washington.

Specimens examined: Olympic Mountains, *Flett*, July 20, 1897; Mount Rainier, *Flett*, August 27, 1896.

4. Artemisia frigida Willd. Sp. Pl. **3**: 1838. 1803.

Type locality: "Daŭŭriae."

Range: Washington to Saskatchewan, south to New Mexico and Texas.

Specimens examined: "Interior Oregon," i. e. Washington, *Cooper* in 1853; Colville Reservation, *Griffiths & Cotton* 362.

5. Artemisia biennis Willd. Sp. Pl. **3**^{3}: 1842. 1803.

Type locality: "Nova Zelandia ?"

Range: Washington to Hudson Bay, south to California and Colorado.

Specimens examined: Waitsburg, *Horner* 545; Colton, *Piper* 2660.

6. Artemisia longepedunculata Rudolphi, Nov. Mem. Soc. Imp. Nat. Mosc. **3**: 77. 1834.
Artemisia norvegica pacifica A. Gray, Syn. Fl. **1**^{2}: 371. 1884.

Type locality: "In Siberia ulteriori."

Range: Alaska to Washington. Siberia.

Specimens examined: Horseshoe Basin, *Elmer* 705.

7. **Artemisia ludoviciana** Nutt. Gen. 2: 143. 1818.

Artemisia gnaphalodes Nutt. loc. cit.

Artemisia diversifolia Rydberg, Bull. Torr. Club **28**: 21. 1901.

TYPE LOCALITY: "On the banks of the Mississippi, near St. Louis; also on the alluvial plains of the Missouri."

RANGE: British Columbia to Michigan, south to California and Texas.

SPECIMENS EXAMINED: Lake Chelan, *Lake & Hull*, August 12, 1892; Wenache, *Whited* 1338, 11; Yakima, *Watt*, August, 1895; junction Crab and Wilson creeks, *Sandberg & Leiberg* 337; Sprague, *Lake & Hull* 725; Spokane, *Piper* 3519; *Elmer* 867; Pullman, *Piper* 1586; Salmon River, *Horner* 342; Rock Lake, *Lake & Hull* 724; Coulee City, *Lake & Hull*, August, 1892; west Klickitat County, *Suksdorf* 1610; Toppenish, *Cotton* 778; Ellensburg, *Elmer* 378; Lake Chelan, *Gorman* 679; Sheep Springs, *Leiberg* 944; Walla Walla, *Wilkes Expedition* 944; Fort Colville, *Watson* 227; Blue Mountains, *Horner* 296; without locality, *Vasey* 479, 482; Squaw Creek, *Cotton* 867.

ZONAL DISTRIBUTION: Arid Transition and Upper Sonoran.

An exceedingly common species presenting great variability as to leaf contour and pubescence. Several such forms have been considered species or subspecies, a disposition which seems to us entirely artificial. The plant is often called "white sage."

8. **Artemisia atomifera** sp. nov.

Cespitose, often in large clumps; stems suffrutescent, mostly simple up to the inflorescence, 60 to 120 cm. high, coarsely striate, canescent or glabrate; leaves numerous, subsessile, firm, and rather rigid, green and nearly glabrous above, speckled with numerous white resinous atoms, closely white-tomentose beneath, excessively variable as to form, either all lanceolate and entire or all dentate or laciniate, or the larger ones 5 to 7-pinnately divided with narrow lobes, usually the upper ones entire, the lower variously dentate or lobed, commonly 2 to 6 cm. long; panicle oblong or somewhat pyramidal, 10 to 20 cm. long, more or less leafy-bracted, the heads glomerate or spicate on the ascending branches; involucre campanulate, canescently tomentose, more or less atomiferous like the leaves, 2 to 4 cm. high; bracts about 10, ovate, obtuse; flowers 10 to 25 in each head; mature akenes linear-oblong, glabrous, destitute of pappus.

A species with the habit and appearance of *A. ludoviciana* Nutt., to which it is closely allied, but apparently well marked by the peculiar atomiferous character of the upper leaf surface. The odor is decidedly more pungent than that of *A. ludoviciana*. I have never met the species except in Snake River canyon at Wawawai and Almota.

The type, in the U. S. National Herbarium, is my no. 6466 from Wawawai, a good series of which shows the variability of the foliage. Other specimens were collected at Wawawai July 19, 1892, and at Almota under no. 2321.

9. **Artemisia tilesii** Ledeb. Mem. Acad. St. Petersb. **5**: 568. 1815.

Artemisia tilesii elatior Torr. & Gr. Fl. **2**: 422. 1843.

Artemisia arachnoidea Sheldon, Bull. Torr. Club **30**: 310. 1903.

TYPE LOCALITY: "Hab. in Kamtschatka."

RANGE: Alaska to Oregon.

SPECIMENS EXAMINED: Mount Stuart, *Elmer* 1199; Cascade Mountains, *Tweedy & Brandegee* 115, 469; west Klickitat County, *Suksdorf* 871; Lake Chelan, *Lake & Hull*, August 24, 1892; Olympic Mountains, *Piper*, August, 1895; Lake Cushman, *Piper*, August, 1895; Peshastin, *Sandberg & Leiberg* 492; Twisp River, *Whited*, July 20, 1896; near Vancouver, *Sheldon* 11284.

ZONAL DISTRIBUTION: Hudsonian and Canadian.

The type of *A. arachnoidea* Sheldon seems to me only a form of this variable species.

10. **Artemisia discolor** Dougl.; DC. Prod. **6**: 109. 1837.

?*Artemisia michauxiana* Besser, Abrot. 71. 1834. "Ad fluv. Columbiam. Douglas."

Artemisia stenoloba Rydberg, Mem. N. Y. Bot. Gard. **1**: 432. 1900.

Type locality: "In America bor. ad Rocky Mountains, prope Spokan et Kettle Falls." Collected by Douglas.

Range: British Columbia and Montana to California and Utah.

Specimens examined: Cascade Mountains, 49°, *Lyall* in 1859; Cascade Mountains to Colville, *Lyall* in 1860; Mount Adams, *Henderson*, August 10, 1892; *Suksdorf* 35; Yakima County, *Brandegee;* Loomis, *Elmer* 589; Box Canyon, *Kreager* 388.

Zonal distribution: Arid Transition.

11. **Artemisia lindleyana** Besser; Hook. Fl. **1**: 322. 1834, and Abrot. 35. 1834.

Type locality: "Northwest coast of America." Collected by Douglas.

Range: Washington and Oregon.

Specimens examined: West Klickitat County, *Suksdorf* 193, 1611; banks of Columbia at Alder Creek, *Brandegee* 908; Pasco, *Henderson;* Bingen, *Piper* 6450.

Along with the original description of the species, Besser describes four subspecies based wholly on leaf contour, which character in this group we consider worthless. Besser's subspecies are named *legitima, brevifolia, subdentata,* and *coronopus.*

12. **Artemisia suksdorfii** Piper, Bull. Torr. Club **28**: 42. 1901.

Artemisia vulgaris littoralis Suksdorf, Deutsch. Bot. Monatss. **18**: 98. 1900, not *A. littoralis* Retz.

Type locality: Fairhaven, Washington.

Range: Seacoast, British Columbia to California.

Specimens examined: Montesano, *Heller* 3976; Fairhaven, *Piper* 2808; *Henderson* in 1892; Seattle, *Piper;* Chuckanut Bay, *Suksdorf* 980.

Zonal distribution: Humid Transition.

13. **Artemisia tridentata** Nutt. Trans. Am. Phil. Soc. **7**: 398. 1841.

Common sagebrush.

Type locality: "Plains of the Oregon and Lewis River." Collected by Nuttall.

Range: Washington to Montana, Colorado, and eastern California.

Specimens examined: North Yakima, *Watt*, August, 1895; *Leckenby;* Mount Adams, *Suksdorf* 72; plains of the Columbia and Lewis rivers, *Nuttall;* Okanogan, *Cooper* in 1853; Wenache, *Whited* 1332; Peshastin, *Sandberg & Leiberg* 470; Rattlesnake Mountains, *Dunn*, September 10, 1902; Moses Coulee, *Lake & Hull* 717; Chelan, *Elmer* 850; without locality, *Vasey* 480.

Zonal distribution: Upper Sonoran.

For illustrations of *Artemisia tridentata* see Plates IV and VI, facing pages 25 and 36.

14. **Artemisia arbuscula** Nutt. Trans. Am. Phil. Soc. **7**: 398. 1841.

Type locality: "On the arid plains of upper California, on Lewis River."

Range: Washington to Wyoming and California.

Specimens examined: Wenache Mountains, *Whited* 861, *Cotton* 1795, 1796.

Two specimens collected by Cotton in the Wenache Mountains, nos. 1565 and 1798, represent a plant intermediate in characters between *A. arbuscula* and *A. tridentata*, and this is said to occupy a belt above the latter and below the former. It is probably an undescribed species, but better material is needed.

15. **Artemisia rigida** A. Gray (Nutt.) Proc. Am. Acad. **19**: 49. 1884.

Scabland sagebrush.

Artemisia trifida rigida Nutt. Trans. Am. Phil. Soc. **7**: 398. 1841.

Type locality: "The plains of Lewis River." Collected by Nuttall.

Range: Idaho, eastern Washington, and eastern Oregon.

Specimens examined: Mount Adams, *Suksdorf* 72; North Yakima, *Watt*, August, 1895; *Leckenby;* Wenache, *Whited* 1332; Chelan, *Elmer* 850; Moses Coulee, *Lake & Hull* 717; Okanogan County, *Cooper* in 1853; Peshastin, *Sandberg & Leiberg* 470; plains of Columbia and Lewis rivers, *Nuttall;* without locality, *Vasey* 480; Rock Creek, *Cotton* 966; Wawawai, *Piper* 3814, 3815; Fort Simcoe, *Cotton* 1564.

Zonal distribution: Arid Transition.

16. Artemisia tripartita Rydberg, Mem. N. Y. Bot. Gard. 1: 432. 1900.

Artemisia trifida Nutt. Trans. Am. Phil. Soc. 7: 398. 1841, not Turcz. 1832.

TYPE LOCALITY: "Plains of the Rocky Mountains and Oregon." Collected by Nuttall.

RANGE: Washington to Wyoming and California.

SPECIMENS EXAMINED: Wenache, *Whited* 1339; Rattlesnake Mountains, *Cotton* 482; Okanogan River, *Cooper;* near Deep Creek Falls, *Watson* 229; Columbia and Lewis River Plains, *Nuttall;* Wenache Mountains, *Cotton* 1793.

ZONAL DISTRIBUTION: Arid Transition.

17. Artemisia absinthium L. Sp. Pl. 2: 848. 1753. WORMWOOD.

TYPE LOCALITY: European.

SPECIMENS EXAMINED: Pullman, *Burnham*, August 6, 1901; *Piper*, August, 1903.

This species seems to be spreading rapidly.

ARTEMISIA RICHARDSONIANA Besser does not occur in Washington, the "Mt. Rainier Tolmie" specimen of the Synoptical Flora having really been collected on the "E. side Rky. Mts., Burke," as noted by Dr. Gray on the sheet in the Gray Herbarium.

TETRADYMIA.

1. Tetradymia canescens DC. Prod. 6: 440. 1837.

TYPE LOCALITY: "Ad Columbia River." Collected by Douglas.

RANGE: British Columbia to Wyoming, Arizona, and California.

SPECIMENS EXAMINED: Ellensburg, *Elmer* 400; Wenache, *Whited* 166; upper Naches River, *Henderson*, June 3, 1892; Klickitat County, *Howell;* Wilbur, *Henderson*, July 17, 1892; Wilson Creek, *Sandberg & Leiberg*, June, 1893; Coulee City, *Lake & Hull* 731; Crab and Wilson creeks, *Sandberg & Leiberg* 247; Spokane, *Sandberg, Heller, & MacDougal* 930; Palouse River, *Lyall;* without locality, *Vasey* 543; Rattlesnake Mountains, *Cotton* 695.

ZONAL DISTRIBUTION: Upper Sonoran.

ARNICA.

Basal leaves cordate, long-petioled.
Heads rayless; herbage villous and viscid .... 1. *A. discoidea.*
Heads radiate.
Herbage pubescent, the stems hirsute or villous .... 2. *A. cordifolia.*
Herbage glabrous.
Akenes atomiferous-glandular; leaves often similarly glandular on both sides .... 3. *A. gracilis.*
Akenes glabrous or nearly so.
Leaves large, usually dentate, thin .... 4. *A. latifolia.*
Leaves small, crenate-dentate, firm .... 5. *A. betonicaefolia.*
Basal leaves not cordate, short-petioled.
Heads rayless .... 6. *A. parryi.*
Heads radiate.
Leaves dentate or denticulate, mostly rather broad.
Pappus whitish, barbellate.
Herbage viscid-glandular, upper leaves much reduced.
Stems with corm-like base, this covered with a reddish tomentum .... 7. *A. pedunculata.*
Stems from horizontal rootstocks .... 8. *A. fulgens.*
Herbage atomiferous-glandular or glandless; upper leaves but little reduced .... 9. *A. aurantiaca.*
Pappus fuscous, subplumose.
Upper surface of leaves glabrous, sticky.
Stem leaves ovate or ovate-oblong .... 10. *A. amplexicaulis.*

Stem leaves lanceolate or lance-oblong...... 11. *A. macounii.*
Upper surface of leaves pubescent.
Pubescence sparse, pilose................ 12. *A. aspera.*
Pubescence dense, short................... 13. *A. mollis.*
Leaves subentire, rarely lanceolate.
Herbage white-tomentose........................ 14. *A. cana.*
Herbage glabrous or nearly so..................... 15. *A. longifolia.*

1. **Arnica discoidea** Benth. Pl. Hartw. 319. 1849.

Arnica cordifolia eradiata Gray, Syn. Fl. 1²: 381. 1884.

TYPE LOCALITY: Monterey, California.

RANGE: British Columbia to California.

SPECIMENS EXAMINED: Falcon Valley, *Suksdorf* 1617, 565.

2. **Arnica cordifolia** Hook. Fl. Bor. Am. **1**: 331. 1833.

Arnica macrophylla Nutt. Trans. Am. Phil. Soc. **7**: 407. 1841.

TYPE LOCALITY: "Alpine woods of the Rocky Mountains on the east side." Collected by Drummond.

RANGE: British Columbia to California and Colorado.

SPECIMENS EXAMINED: Upper Nisqually Valley, *Allen* 139; Mount Adams, *Flett* 1103; Clealum, *Whited* 621; near Wenache, *Whited* 91, 1101; Eaton, *Henderson*, June 11, 1892; Spokane, *Piper*, May 16, 1896; Hangman Creek, *Sandberg & Leiberg* 42; Kamiak Butte, *Moore*, June 4, 1893; *Piper*, July 20, 1899; without locality, *Vasey* 535; Lake Kalispel, *Kreager* 351.

ZONAL DISTRIBUTION: Arid Transition and Canadian.

3. **Arnica gracilis** Rydberg, Bull. Torr. Club **24**: 297. 1897.

Arnica multiflora Greene, Pittonia **4**: 162. 1900.

TYPE LOCALITY: Spanish Peaks, Montana.

RANGE: Washington to Montana.

SPECIMENS EXAMINED: Baldy Peak, *Lamb* 1306; Mount Steele, *Piper* 2203; Loomis, *Elmer*, August, 1879; Nason Creek, *Sandberg & Leiberg* 682; Mount Adams, *Suksdorf*, September 17, 1883.

4. **Arnica latifolia** Bong. Mem. Acad. St. Petersb. VI. **2**: 147. 1832.

Arnica menziesii Hook. Fl. Bor. Am. **1**: 331. 1833.

TYPE LOCALITY: Sitka.

RANGE: Alaska to Oregon and Colorado.

SPECIMENS EXAMINED: Olympic Mountains, *Piper* 2205, 1072, Cascade Mountains, 49°, *Lyall;* Mount Rainier, *Piper* 2143 and August, 1895; *Flett* 247: Mount Stuart, *Elmer* 1165; Mount Adams, *Henderson*, August 10, 1892; *Suksdorf* 195, *Flett* 1080, upper Nisqually Valley, *Allen* 138; Silverton, *Bouck* 106; Yakima Region, *Brandegee* 913, Skagit Pass, *Lake & Hull* 737; Stevens Pass, *Whited* 1462.

ZONAL DISTRIBUTION: Hudsonian.

5. **Arnica betonicaefolia** Greene, Pittonia **4**: 163. 1900.

TYPE LOCALITY: "At 6000 to 7000 feet on slopes of Mount Steele of the Olympic Mountains."

RANGE: Olympic Mountains, Washington.

SPECIMENS EXAMINED: Baldy Peak, *Lamb* 1306, Mount Steele, *Piper* 2202, Mount Storm King, *Lawrence* 349.

ZONAL DISTRIBUTION: Arctic.

This species is closely allied to *A. latifolia* Bong., and may prove to be nothing but a reduced alpine form of it

6 **Arnica parryi** A Gray Am. Nat. **8**: 213. 1874.

TYPE LOCALITY. Colorado. Collected by Parry.

RANGE: Washington and Oregon to Colorado.

SPECIMENS EXAMINED: Olympic Mountains, *Flett* 130; Mount Rainier, *Piper* 2159; Goat Mountain, *Allen* 137; Mount Adams, *Suksdorf* 566; *Howell*; Loomis, *Elmer* 582; without locality, *Vasey* 536; Wenache Mountains, *Cotton* 1653.

ZONAL DISTRIBUTION: Hudsonian.

7. **Arnica pedunculata** Rydberg, Bull. Torr. Club **24**: 297. 1897.

Arnica monocephala Rydberg, Mem. N. Y. Bot. Gard. **1**: 435. 1900.

TYPE LOCALITY: Spanish Basin, Montana.

RANGE: Washington to Montana.

SPECIMENS EXAMINED: Mountains north of Ellensburg, *Whited* 719; Wenache Mountains, *Whited* 1137; Spangle, *Piper*, May 24, 1901; Rock Lake, *Sandberg & Leiberg* 103; Pullman, *Piper* 1578; *Elmer* 875; Spokane, *Dewart*.

This species is in habit just like the plant referred to *A. fulgens* Pursh, but that has horizontal rootstocks, while this has a cormose base covered with pale reddish tomentum. This difference may not prove constant, and needs further examination in the field. Both the species here mentioned have been referred to *A. alpina* Olin, which, in its typical form at least, does not occur in Washington.

8. **Arnica fulgens** Pursh, Fl. **2**: 527. 1814.

TYPE LOCALITY: "On the banks of the Missouri."

RANGE: British Columbia to Montana and Oregon.

SPECIMENS EXAMINED: Republic, *Beattie & Chapman* 264; Goat Mountains, *Allen* 229; Cascade Mountains to Colville, *Lyall* in 1860; Wenas and Umtanum creeks, *Cotton* 1148; Ellensburg, *Piper* 2677; *Whited* 542, 649; Spokane, *Piper*, July 2, 1896; Sprague, *Henderson* 2279; Waitsburg, *Horner* 598; Pullman, *Piper*, June 13, 1894.

ZONAL DISTRIBUTION. Arid Transition.

9. **Arnica aurantiaca** Greene, Torreya **1**: 42. 1901.

TYPE LOCALITY. "At the head of Keystone Creek, Wallowa Mountains, Oregon, at about 7,000 feet." Collected by Cusick, August, 1900

SPECIMENS EXAMINED: Goat Mountains, *Allen* 229

10. **Arnica amplexicaulis** Nutt. Trans. Am. Phil. Soc. **7**: 408. 1841.

Arnica amplexifolius Rydberg, Mem. N. Y. Bot Gard. **1**: 434. 1900 (February 15).

TYPE LOCALITY: "On the rocks of the Wahlamet at the Falls," Oregon.

RANGE: Washington and Oregon.

SPECIMENS EXAMINED: Cape Horn, *Piper* 4962, 5009; Olympic Mountains, *Piper* 2204; *Flett* 818; Mount Rainier, *Allen* 285a; Skagit Pass, *Lake & Hull* 738.

11. **Arnica macounii** Greene, Pittonia **4**: 160. 1900 (December 8).

TYPE LOCALITY: "Near Comox, Vancouver Island."

SPECIMENS EXAMINED: Skokomish River, *Piper* 1074; Coast Mountains, *Cooper*; Cascade Mountains, 49°, *Lyall* in 1859; White Salmon, *Suksdorf* 28; Lake Cushman, *Kincaid*, June 15, 1892; Olympic Mountains, *Piper*, August, 1895; Mount Stuart, *Elmer* 1194; Bridge Creek, *Elmer* 672; Lake Wenache, *Sandberg & Leiberg* 633.

This species differs from *A. amplexicaulis* only in its narrow leaves, a character far from constant.

12. **Arnica aspera** Greene, Ottawa Nat. **15**: 281. 1902.

TYPE LOCALITY: Mount Rainier. Collected by Greene.

SPECIMENS EXAMINED: Mount Rainier, *Greene*, August 20, 1889.

This species is closely allied to the Alaskan *A. chamissonis* Less., but the pubescence is much harsher.

13. **Arnica mollis** Hook. Fl. Bor. Am. **1**: 231. 1839.

TYPE LOCALITY: "Alpine rivulets of the Rocky Mountains."

RANGE: British Columbia to Quebec, south California, and Colorado.

SPECIMENS EXAMINED: Mount Rainier, *Allen* 285; *Piper* 2139; Mount Adams, *Suksdorf* 567; *Henderson*, August 10, 1892; *Howell* in 1882; *Suksdorf* 567; Yakima County, *Henderson* 2298; Yakima Region, *Brandegee* 912; Mount Stuart, *Elmer* 1164, 1163; Cascade Mountains, 49°, *Lyall* in 1860; Skagit Pass, *Lake & Hull* 736; Stevens Pass, *Sandberg & Leiberg* 725; Bridge Creek, *Elmer*.

Most of the above specimens were distributed as *A. chamissonis* Less., a species which apparently does not reach our limits.

14. **Arnica cana** Greene, Ottawa Nat. **15**: 282. 1902.

Arnica foliosa incana Gray, Bot. Cal. **1**: 416. 1876.

Arnica incana Greene, Pittonia **4**: 169. 1900, not *A. incana* Pers. 1807.

TYPE LOCALITY: Lake Tahoe, California.

RANGE: Washington to California.

SPECIMENS EXAMINED: Cascade Mountains, *Brandegee* 139; White Salmon, *Suksdorf* in 1878; Big Klickitat River, *Henderson* in 1892.

15. **Arnica longifolia** D. C. Eaton in Wats. Bot. King. Explor. 186. 1871.

TYPE LOCALITY: "Clover Mts." Nevada.

RANGE: Washington? and Idaho to California and Utah.

SPECIMENS EXAMINED: Klickitat County, *Suksdorf* 568, a somewhat doubtful specimen. the akenes hairy as well as glandular.

The above treatment of the Washington species of Arnica is far from satisfactory. It is probable that further study in the field will compel the recognition of a larger number of species. Collectors should secure large series of specimens and note carefully which characters are constant and which are due to differences in environment.

PETASITES.

Alpine plant; leaves ovate or oblong, 5 to 7-lobed, 5 to 10 cm. long .... 3. *P. frigida*.
Lowland plants.
  Leaves broadly sagittate, very coarsely dentate .... 1. *P. dentata*.
  Leaves reniform-orbicular, 7 to 11-cleft, very large, often 30 cm. or more broad .... 2. *P. speciosa*.

1. **Petasites dentata** Blankinship, Mont. Agr. Coll. Sci. Stud. **1**: 64. 1905.

TYPE LOCALITY: "The common Rocky Mountain species."

RANGE: British Columbia to Hudson Bay south to Colorado.

SPECIMENS EXAMINED: Marshall Junction, *Piper*, July 2, 1896; Pend Oreille River, *Lyall* in 1861.

ZONAL DISTRIBUTION: Canadian.

This species has been generally confused with the entire leaved *P. sagittata* Pursh of the Hudson Bay region.

2. **Petasites speciosa** (Nutt.) Piper, Mazama **2**: 97. 1901.

Nardosmia speciosa Nutt. Trans. Am. Phil. Soc. **7**: 288. 1840.

TYPE LOCALITY: "Shady forests of the Oregon and Wahlamet by streams." Collected by Nuttall.

RANGE: British Columbia to California.

SPECIMENS EXAMINED: Port Ludlow, *Binns;* Seattle, *Piper* 123; Silverton, *Bouck* 104; Tacoma, *Flett* 201; upper Nisqually Valley, *Allen* 54; Larm River, *Suksdorf* 140; Wenache Mountains, *Whited* 1341.

ZONAL DISTRIBUTION: Humid Transition.

This species is entirely different from the eastern *P. palmata* (Ait.) Gray, with which authors have confused it.

3. **Petasites frigida** (L.) Fries, Sum. Veg. Scand. 182. 1846.

Tussilago frigida L. Sp. Pl. 2: 865. 1753.

Petasites nivalis Greene, Pittonia 2: 18. 1889.

TYPE LOCALITY: "Habitat in Alpium Lapponiae, Helvetiae, Siberiae convallibus."

RANGE: Alaska to Washington and Lake Superior. Europe. Asia.

SPECIMENS EXAMINED: Baldy Peak, *Lamb* 1356; Olympic Mountains, *Piper* 2190; Mount Rainier, *Smith* in 1889; *Piper* in 1890; Skagit Pass, *Lake & Hull* 803; Stevens Pass, *Sandberg & Leiberg* 783.

ZONAL DISTRIBUTION: Hudsonian.

CACALIOPSIS.

1. **Cacaliopsis nardosmia glabrata** Piper, Bull. Torr. Club 29: 222. 1902.

TYPE LOCALITY: Klickitat County, Washington. Collected by Suksdorf.

RANGE: Washington in the Cascade Mountains.

SPECIMENS EXAMINED: Klickitat County, *Suksdorf* in 1883; Klickitat River, *Flett* 1104; Simcoe Mountains, *Howell;* near Wenache, *Whited* 1136; Stevens Pass, *Sandberg & Leiberg* 564; Roslyn, *Whited* 425; Wenache Mountains, *Cotton* 1271.

ZONAL DISTRIBUTION: Arid Transition.

LUINA.

1. **Luina hypoleuca** Benth.; Hook. Ic. Pl. 12: 36. *t. 1139*. 1873.

TYPE LOCALITY: "Amongst rocks, Cascade Mountains, Lake Chilukweyuk," Washington. Collected by Lyall.

RANGE: British Columbia to California.

SPECIMENS EXAMINED: Olympic Mountains, *Piper*, August, 1895; Cascade Mountains, latitude 49°, *Lyall;* Mount Rainier, *Piper* 2151, 352; *Flett* 246; Goat Mountain, *Allen* 31; Skokomish River, *Kincaid*, June 14, 1892; Silverton, *Bouck;* Yakima County, *Brandegee;* Stevens Pass, *Sandberg & Leiberg* 784; Skagit Pass, *Lake & Hull* 805; Stampede Pass, *Henderson*, June 26, 1892; Bridge Creek, *Elmer* 687; without locality, *Vasey* 540; Mount Storm King, *Lawrence* 325.

ZONAL DISTRIBUTION: Hudsonian.

RAINIERA.

1. **Rainiera stricta** Greene, Pittonia 3: 291. 1898.

Prenanthes stricta Greene, Pittonia 2: 21. 1889.

Luina piperi Robinson, Bot. Gaz. 16: 43. *t 6*. 1891.

Psacalium strictum Greene, Pittonia 2: 228. 1892.

TYPE LOCALITY: Mount Rainier, Washington.

RANGE: Cascade Mountains of Washington.

SPECIMENS EXAMINED: Mount Rainier, *Piper*, August, 1895: Goat Mountains, *Allen*, 140; *Flett* 2140; near Mount Adams, *Henderson* 2320: Mount Rainier, *Greene* in 1889.

ZONAL DISTRIBUTION: Hudsonian.

CROCIDIUM.

1. **Crocidium multicaule** Hook. Fl. Bor. Am 1: 335. 1833.

TYPE LOCALITY: "About Fort Vancouver," Washington.

RANGE: Washington and Idaho to California.

SPECIMENS EXAMINED: Whidby Island, *Gardner* 183; Orcas Island, *Lyall* in 1858; Tacoma, *Flett* 79; Ellensburg, *Whited* 262; near Ellensburg, *Whited* 64; foothills Blue Mountains, *Horner* 165; without locality, *Cooper*.

ZONAL DISTRIBUTION: Transition.

SENECIO.

Annual; calyculate bracts of the involucre several, short, closely appressed, distinctly black-tipped........................ 1. *S. vulgaris.*

Biennials or perennials; calyculate bracts of the involucre few, not closely appressed, slightly or not at all black-tipped (except in *S. lugens*).

Leaves, or some of them, pinnate or pinnatifid.

Stems mostly leafy; leaves all pinnatifid or the lowermost undivided and orbicular; pubescence if any crisp-hairy, not woolly.

Leafy to the inflorescence; leaves thin......... 2. *S. harfordii.*

Leafy at the base, naked above; leaves thick... 3. *S. flettii.*

Stems leafy below, the upper leaves much reduced, mostly pinnatifid or pinnatisect; pubescence if any white woolly.

Herbage densely white woolly or floccose; pubescence usually persistent.

Pubescence persistent except in *S. fastigiatus;* leaves 1 to 2 cm. broad.

Petioles of the basal leaves usually shorter than the blades............ 12. *S. canus.*

Petioles of the basal leaves usually exceeding the blades.

Leaves entire to pinnate-lobed; upper leaf surface usually permanently woolly.............. 13. *S. howellii.*

Leaves entire or dentate; upper leaf-surface often glabrate...... 14. *S. fastigiatus.*

Pubescence floccose, more or less evanescent; leaves 1 to 5 cm. broad.

Involucral bracts and bractlets not conspicuously black-tipped......... 15. *S. elmeri.*

Involucral bracts and bractlets conspicuously black tipped................ 16. *S. lugens.*

Herbage not densely lanate nor floccose; pubescence confined chiefly to the base of the stems and the leaf-axils.

Heads discoid (except in subspecies *fallax*). 4. *S. pauciflorus.*

Heads radiate.

Stems 10 to 30 cm. high; heads usually solitary.

Cauline leaves much reduced, bract-like..................... 5. *S. subnudus.*

Cauline leaves when present broad and subamplexicaul, closely pectinate...................... 6 *S. ovinus.*

Stems 30 to 70 cm. high; heads several to many.

Leaves thin in texture, the lower distinctly ovate............... 7 *S. pseudaureus.*

Leaves thick in texture the lower not ovate.

Akenes hispidulous on the angles................. 11. *S. balsamitae.*

Akenes glabrous.

Basal leaves obovate or oblanceolate, dentate only toward the apex.. 9. *S. cymbalarioides.*

Basal leaves crenate-dentate from the base to apex or subentire.

Glabrous; basal leaves nearly quadrangular, sinuate, dentate or entire. 10. *S. fraternus.*

More or less pubescent, especially in the leaf axils; leaves often cuneata at base....... 8. *S. adamsi.*

Leaves not at all pinnate nor pinnatifid.

Rootstock woody; stems low; leaves small, thick.... 26. *S. ductoris.*

Rootstock none or not woody; stems tall; leaves, at least the basal ones, large.

Stems tall, clustered, leafy to the inflorescence.

Leaves triangular-lanceolate, petiolate, coarsely dentate........................ 24. *S. triangularis.*

Leaves lanceolate, sessile.

Margin of leaves evenly serrate....... 25. *S. serra.*

Margin of leaves entire................25a. *S. serra lanceolatus.*

Stems usually solitary; leaves mostly basal, the cauline much reduced.

Herbage wholly glabrous

Leaves glaucous, quite fleshy, mostly entire............................ 17. *S. hydrophilus.*

Leaves not glaucous, mostly dentate.

Bracts of the involucre 6 to 7 mm. long, stramineous............. 18. *S. hydrophiloides.*

Bracts of the involucre 7 to 8 mm. long, brownish .... 19. *S. foetidus.*

Herbage more or less pubescent with long jointed somewhat intermixed hairs.

Heads discoid....................... 20. *S. vaseyi.*

Heads radiate.

Heads 8 to 10 mm high in anthesis; bracts of the involucre usually 13, from 5 to 7 mm. long....................... 21. *S. exaltatus.*

Heads 10 to 12 mm. high in anthesis; bracts of the involucre about 21, from 6.5 to 8.5 mm. long.

Inflorescence open .... 22. *S. atriapiculatus*

Inflorescence dense.......... 23. *S. condensatus.*

1. **Senecio vulgaris** L. Sp. Pl. **2.** 867. 1753. GROUNDSEL.

TYPE LOCALITY: European.

SPECIMENS EXAMINED: Pullman, *Piper*, June 2, 1894; Seattle, *Piper* in 1885; Lowe
Cascades, *Suksdorf*, May 29, 1886.

2. Senecio harfordii Greenman, sp. nov.

Glabrous or essentially so throughout; stem erect or ascending from a slender rootstock, 2 to 5 dm. high, somewhat glaucous, usually leafy; leaves mostly pinnately divided, with irregularly lobed divisions, and these in turn dentate, including the petiole 4 to 14 cm. long, 1 to 5 cm. broad, thin in texture, and drying pale green; the lowermost leaves often undivided, rotund and crenately lobed; uppermost leaves epetiolate: inflorescence a terminal corymbose cyme, few to many- (2 to 30-) headed; heads mostly less than 1 cm. high, including the rays 1.5 to 2 cm. in diameter; involucre shorter than the flowers of the disk; bracts of the involucre about 13, narrowly lanceolate, 5 to 5.5 mm. long, acuminate, acute, glabrose; ray-flowers commonly 5; rays bright yellow; disk flowers 18 to 25; achenes 2.5 to 3.5 mm. long, glabrous.

OREGON: Rocky high lands, Cascade Mountains, May 31, 1869, *W. G. W. Harford & Geo. W. Dunn* 540 (hb. Gray), type; Rooster Rock, June, 1877, J. *Howell* (hb. Gray, and hb. Field Mus.); rocky banks of Columbia River, western Oregon, June, 1880, *Thomas J. Howell* (hb. Field Mus.); Bonneville, Multnomah County, July 17, 1885, *W. N. Suksdorf* 572 (hb. Gray); Multnomah Falls, July 27, 1902, *E. P. Sheldon* 11004 (hb. Gray), and at the same locality, June 25, 1904, *C. V. Piper* 6212 (hb. Gray).

WASHINGTON: On mountains near the Lower Cascades, May 29, 1886, *W. N. Suksdorf* (hb. Gray); in woods, Lower Cascades, May 29, 1887, *W. N. Suksdorf* 872 (hb. Gray); south of Mount Adams, August 4, 1887, *J. B. Flett* 1087 (hb. Piper). Differs from *S. bolanderi* A. Gray in being essentially glabrous throughout, in having somewhat thinner leaf texture, a shorter involucre with fewer involucral bracts and fewer flowers.

3. Senecio flettii Wiegand, Bull. Torr. Club **26**: 137. 1899.

TYPE LOCALITY: "Near the headwaters of the Quilcene River, Olympic Mountains." Collected by Flett.

RANGE: Olympic Mountains, Washington.

SPECIMENS EXAMINED: Olympic Mountains, *Flett* 801; *Elmer* 2620; Mount Steele, *Piper* 2196, 929.

ZONAL DISTRIBUTION: Arctic.

4. Senecio pauciflorus Pursh, Fl. **2**: 529. 1814.

TYPE LOCALITY: "In Labrador."

RANGE: British Columbia and Washington to Labrador.

SPECIMENS EXAMINED: Mount Constitution, *Henderson* 2312; Big Meadows, *Kreager* 428· Deming, *Flett* 852 in part.

ZONAL DISTRIBUTION: Transition and Canadian.

4a. Senecio pauciflorus fallax Greenman, subsp. nov.

Stem erect, about 5 dm. high; lower stem-leaves 3 to 8 cm. long, 1 to 2.5 cm broad, pinnately parted with deep broad sinuses between the lateral divisions, blackish or dark green in the dried state; segments narrowly oblong to subovate, obtusely toothed; upper leaves reduced to mere bracts; inflorescence cymose, few-headed; heads 8 to 10 mm. high, radiate, involucre campanulate; bracts of the involucre 18 to 21, linear, acute, 6 to 8 mm. long, slightly purplish-tipped, glabrous; ray-flowers 10 to 12; rays yellow; disk-flowers 50 to 60, achenes glabrous.

WASHINGTON: Roadside in partial shade, Deming, Whatcom County, June 30, 1898, *J. B. Flett*, no. 852 in part (type in hb. Piper, fragment and tracing in hb Gray).

The subspecies *fallax* is readily separated from *D. pseudaureus* on the characters of the foliage.

5. Senecio subnudus DC. Prod. **6**: 428. 1837.

Senecio aureus subnudus A. Gray, Syn. Fl. 1^2: 391. 1884.

TYPE LOCALITY. "Ad Columbia River." Collected by Douglas.

RANGE. Washington and Montana to California.

Specimens examined: Near Mount Adams, *Henderson* 2308; Yakima region, *Brandegee* 915; Chiquash Mountains, *Suksdorf* 2167.

Zonal distribution: Hudsonian.

6. **Senecio ovinus** Greene, Pittonia 4: 110. 1900.

Type locality: "On Sheep Mountain, Alberta."

Range: Washington, Montana, and Alberta.

Specimens examined: North Fork of Bridge Creek, *Elmer*, August, 1897; Horseshoe Basin, *Lake & Hull*, August 24, 1892.

Zonal distribution: Arctic.

7. **Senecio pseudaureus** Rydberg, Bull. Torr. Club 24: 298. 1897.

Type locality: Little Belt Mountains, Montana

Range: Washington to Nevada and Colorado

Specimens examined: Cascade Mountains, 49°, *Lyall* in 1860, Mount Adams, *Suksdorf* 570, Falcon Valley, *Suksdorf* 571, without locality *Brandegee* 917; Ellensburg, *Elmer* 431; *Whited* 442; Lake Keechelus, *Henderson* in 1892; without locality, *Vasey* in 1889; Fort Okanogan, *Wilkes Expedition* 971

Zonal distribution: Canadian.

8. **Senecio adamsi** Howell, Fl. N W. Am. 379. 1900.

Type locality Mount Adams, Washington.

Range. Known only from Mount Adams

Specimens examined Mount Adams, *Suksdorf* 73, *Henderson* 2309; *Flett* 1093.

Zonal distribution Arctic

9. **Senecio cymbalarioides** Nutt. Trans Am. Phil. Soc. 7: 412. 1841.

Type locality. "In Oregon"

Range. Washington to Athabasca and Utah

Specimens examined. Cascade Mountains, 49°, *Lyall* in 1860; Mount Chapaca, *Elmer* 592; Pinyon Creek, *Gorman* 809, Twenty-five Mile Creek, *Gorman* 810.

10. **Senecio fraternus** sp. nov

Perennial, glabrous throughout, the several more or less flexuous stems erect or nearly so, arising from a stout caudex, stems about 30 cm high, somewhat coarsely striate, basal leaves thickish, somewhat quadrangular. subentire or with 7 to 11 coarse sinuations, 2 to 3 cm. long, the blade abruptly contracted to a narrowly-margined petiole about twice as long; cauline leaves about 6 spatulate-oblanceolate to oblong, becoming smaller and lobed upward, sessile or nearly so, the lateral lobes 4 to 8, oblong-linear, obtuse, heads 8 to 12 in a rather close or convex cymose cluster, only the lower elongated rays branched, involucre somewhat turbinate, of from 11 to 13 linear-lanceolate acutish bracts 6 to 7 mm. long, with a few calyculate ones at base, rays few, bright yellow, oblong, 7 mm long, florets 15 to 20, akenes glabrous

Collected on Mount Stuart, Kittitas County, Washington, by Sandberg & Leiberg, no. 553, July 24, 1893. at an altitude of 1,060 meters. The type specimen is in the United States National Herbarium, numbered 285758

The species is somewhat intermediate between *S cymbalarioides* Nutt and *S. adamsi* Howell.

11. **Senecio balsamitae** Muhl, Willd. Sp. Pl 3: 1998 1803.

Type locality: "In America boreali"

Range: British Columbia and Washington to Quebec and Pennsylvania.

Specimens examined Colville Reservation, *Griffiths & Cotton* 366, Republic, *Beattie & Chapman* 2256, Wenache, *Whited* 1096, Pasco, *Hindshaw* 8.

Zonal distribution. Transition.

12. Senecio canus Hook. Fl. Bor. Am. **1**: 333. 1833.

TYPE LOCALITY: "Banks of the Saskatchewan, rare." Collected by Drummond.

RANGE: British Columbia to Saskatchewan, Dakota, and Colorado.

SPECIMENS EXAMINED: Cascade Mountains, 49°, *Lyall* in 1860.

13. Senecio howellii Greene, Bull. Torr. Club **8**: 98. 1881.

TYPE LOCALITY: "On the upper Columbia River in Oregon." Collected by Howell. The label of the type collection reads "Columbia River opposite the mouth of the Des Chutes."

RANGE: Washington and Idaho to California.

SPECIMENS EXAMINED: Wenache, *Whited* 1142; Rock Island, *Sandberg & Leiberg* 457; Pasco, *Hindshaw*, May 25, 1896; Loon Lake, *Winston*, July 20, 1897; Spokane County, *Suksdorf* 275; Spokane, *Henderson*, May 31, 1892; *Piper* 2267; Hangman Creek, *Suksdorf* 934; Clarks Springs, *Kreager* 98; Wenache Mountains, *Cotton* 1249; *Whited* 1361; eastern Washington, *Wilkes Expedition.*

ZONAL DISTRIBUTION: Arid Transition.

This was listed by Torrey in the Botany of the Wilkes Expedition as *S. aureus borealis.*

14. Senecio fastigiatus Nutt. Trans. Am. Phil. Soc. **7**: 410. 1841.

Senecio spatuliformis Heller, Bull. Torr. Club **26**: 552. 1899.

TYPE LOCALITY: "The plains of Oregon, near the Wahlamet." Collected by Nuttall.

RANGE: Washington and Oregon in the coast region.

SPECIMENS EXAMINED: Mason County, *Piper*, July 20, 1890; Yelm, *Smith* 538; Clarke County, *Henderson;* Elma, *Heller* 4061; Mill Plain, *J. Howell*, June, 1877; Mount Constitution, *Flett* 2734.

ZONAL DISTRIBUTION: Humid Transition.

14a. Senecio fastigiatus macounii (Greene) Greenman.

Senecio macounii Greene, Pittonia **3**: 169. 1897.

TYPE LOCALITY: Mount Benson, Vancouver Island.

RANGE: Vancouver Island and Washington.

SPECIMENS EXAMINED: Mount Constitution, *Flett* 2730, 2743; Valley of the Columbia River, *Lyall* in 1860.

15. Senecio elmeri Piper, Erythea **7**: 173. 1899.

Senecio crepidineus Greene, Ottawa Nat. **15**: 250. 1902.

TYPE LOCALITY: "On gravelly moraines at the head of North Fork of Bridge Creek, Okanogan County," Washington. Collected by Elmer.

RANGE: British Columbia to Oregon.

SPECIMENS EXAMINED: Without locality, *Brandegee* 920, 985; Bridge Creek, *Elmer* 715; Mount Stewart, *Elmer* 1200.

16. Senecio lugens Richards. Bot. App. Frankl. Journ. 748. 1823.

TYPE LOCALITY: "At Bloody Fall, where the Esquimaux were destroyed by the Northern Indians that accompanied Hearne, whence the specific name." This place is on the Coppermine River in Yukon.

RANGE: Yukon to Washington and Montana.

SPECIMENS EXAMINED: Olympic Mountains, *Flett* 95, 800.

ZONAL DISTRIBUTION: Arctic.

17. Senecio hydrophilus Nutt. Trans. Am. Phil. Soc. **7**: 411. 1841.

TYPE LOCALITY: "In the Rocky Mountains by Ham's Fork of the Colorado of the West." Collected by Nuttall.

RANGE: British Columbia to California and Colorado.

SPECIMENS EXAMINED: Spokane, *Kreager* 556; *Elmer* 863; *Piper* 2382; Falcon Valley, *Suksdorf* 419; Pend Oreille River, *Lyall* in 1861.

ZONAL DISTRIBUTION: Arid Transition and Canadian.

18. Senecio hydrophiloides Rydberg, Mem. N. Y. Bot. Gard. 1: 441. 1900.

Type locality: Idaho.

Range: Washington to Montana.

Specimens examined: Spokane, *Piper*, July 2, 1896; Spokane County, *Suksdorf* 376; *Ramm*, July, 1883; Clarks Springs, *Kreager* 55; Falcon Valley, *Suksdorf*, July 5, 1881.

Zonal distribution: Arid Transition.

19. Senecio foetidus Howell, Fl. N. W. Am. 1: 377. 1900.

Type locality: Klickitat Valley, Washington.

Range: Known only from the type locality.

Specimens examined: Klickitat Valley, *Howell* 224.

20. Senecio vaseyi Greenman, sp. nov.

An herbaceous perennial, more or less pubescent throughout with jointed crisp hirsutish hairs, later glabrate; stem erect, 4 to 7 cm. high, simple; leaves elliptic-ovate to lanceolate, 5 to 10 cm. long, 1 to 4 cm. broad, acute or obtuse, entire or inconspicuously denticulate, narrowed at the base into a winged petiole; the upper leaves remote, lanceolate from a sessile subclasping base; inflorescence a simple or compound corymbose cyme; heads medium-sized, 10 to 12 mm. high, discoid; involucre campanulate, sparingly bracteolate: bracts of the involucre 12 to 18, linear-lanceolate, acute, black-tipped; achenes glabrous. Washington: without definite locality, coll. of 1889, *G. R. Vasey*, no. 568 (hb. Gray); in and near the Cascade Mountains of Kittitas, Chelan, and King counties, coll. of 1889, *G. R. Vasey*, without number (hb. Piper); Klickitat River, Cascade Mountains, August 3, 1892, *L. F. Henderson* (hb. Piper); Chewaukum, *Whited* 2532; Spipen [Naches] River to Columbia River, *Wilkes Expedition*. California: Mount Shasta, altitude 7,500 feet, August 23, 1881, *C. G. Pringle*, no. 6 (hb. Gray and hb. Field Mus.); Lassens Peak, coll. of 1875, *J. G. Lemmon* (hb. Gray).

21. Senecio exaltatus Nutt. Trans. Am. Phil. Soc. 7: 410. 1841.

Type locality: "The plains of the Oregon, near the mouth of the Wahlamet."

Range: Washington and Idaho to California.

Specimens examined: Pullman, *Piper* 1608; upper Atanum River, *Henderson* 2311.

Zonal distribution: Transition.

21a. Senecio exaltatus ochraceus nom. nov.

Senecio cordatus Nutt. Trans. Am. Phil. Soc. 7: 411. 1841, not Koch, 1834.

Senecio lugens ochroleucus A. Gray, Syn. Fl. 1^2: 388. 1884, not *S. ochroleucus* Hook. & Arn. 1841.

Type locality: "Near the outlet of the Wahlamet."

Range: British Columbia to California.

Specimens examined: Mount Rainier, *Flett* 2167; Klickitat County, *Suksdorf* 23; *Howell* in 1879; Goat Mountain, *Allen* 230; High Prairie, Klickitat County, *Suksdorf* 1620; Simcoe Mountains, *Howell*, June, 1881; Wenache Mountains, *Cotton* 1196; Ellensburg, *Piper*, May 20, 1897; without locality, *Vasey* in 1889.

Zonal distribution: Transition.

22. Senecio atriapiculatus Rydberg, Mem. N. Y. Bot. Gard. 1: 442. 1900.

Senecio columbianus Greene, Pittonia 3: 170. 1900, not *S. renifolius columbiensis* A. Gray. 188'.

Type locality: None definitely given.

Range: British Columbia to Washington and Montana.

Specimens examined: Mount Carlton, *Kreager* 242; Wenache, *Whited* 88.

Zonal distribution: Arid Transition.

23. Senecio condensatus Greene, Pittonia 3: 298. 1898.

Type locality: "High ridges of the Blue Mountains, Walla Walla Co., Washington." Collected by Piper.

Specimens examined: Blue Mountains, *Piper* 2434; Waitsburg, *Horner*, April 17, 1897.

24. Senecio triangularis Hook. Fl. Bor. Am. **1**: 332. 1833.

Senecio longidentatus DC. Prod. **6**: 428. 1837.

Senecio gibbonsii Greene, Pittonia **2**: 20. 1889.

Type locality: Rocky Mountains. Collected by Drummond.

Range: British Columbia to Saskatchewan, south to California and Colorado.

Specimens examined: Mount Rainier, *Piper* 2154; Mount Adams, *Flett* 1083; Stevens Pass, *Sandberg & Leiberg* 732; Stampede Tunnel, *Henderson*, July 26, 1892; Bridge Creek, *Elmer* 647; Blue Mountains, *Horner* 344.

Zonal distribution: Canadian and Hudsonian, occasionally Transtion.

The type of *S. gibbonsii* Greene was collected in salt marshes at the mouth of the Columbia River. The original specimen has the leaves only few-toothed, but abundant material collected by the writer just above Astoria in salt marshes seems in every way typical *S. triangularis*. This is a remarkable station for the species, which is usually subalpine in its habitat.

24a. Senecio triangularis subvestitus (Howell) Greenman.

Senecio subvestitus Howell, Erythea **3**: 35. 1895.

Type locality: "In wet meadows, top of Siskiyou Mountains near Waldo, Oregon."

Range: British Columbia to California.

Specimens examined: East of Mount Adams, *Henderson* 2310.

25. Senecio serra Hook. Fl. Bor. Am. **1**: 333. 1833.

Type locality: "Common on the banks of the Wallawallah, Spokan, and Flathead rivers." Collected by Douglas.

Range: Washington to Wyoming and Colorado.

Specimens examined: Ellensburg, *Whited* 702, 495; North Yakima, *Steinweg* 894; Egbert Springs, *Sandberg & Leiberg* 392; Kooskooskie to Walla Walla, *Wilkes Expedition* 521; along Coppei River, *Horner* 356; Pullman, *Piper* 1609; Cow Creek, *Griffiths & Cotton* 527; Rattlesnake Mountains, *Cotton* 675.

Zonal distribution: Arid Transition.

25a. Senecio serra lanceolatus (Torr. & Gr.).

Senecio lanceolatus Torr. & Gr. Fl. **2**: 440. 1843.

Senecio andinus Nutt. Trans. Am. Phil. Soc. **7**: 409. 1841, not Buek. 1840.

Senecio serra integriusculus A. Gray, Syn. Fl. 1^2: 387. 1884.

Type locality: "Rocky Mountains." Collected by Nuttall, probably in Wyoming.

Range: Washington to Wyoming and California.

Specimens examined: Atanum Soda Springs, *Watt*, August, 1895; Cascade Mountains, *Tweedy*, August, 1882; Falcon Valley, *Suksdorf*, July 28, 1882; Waitsburg, *Horner* 572.

Zonal distribution: Arid Transition.

26. Senecio ductoris nom. nov.

Senecio fremonti Torr. & Gr. Fl. **2**: 445. 1843, not *S. filifolius fremontii* Torr. & Gr. Fl. **2**: 444.

Type locality: "Wind River Chain, Rocky Mountains."

Range: British Columbia to California and Colorado.

Specimens examined: Mount Rainier, *Allen* 144; *Piper* 2146; Bridge Creek, *Elmer* 695; Olympic Mountains, *Piper* 2201.

Zonal distribution: Arctic.

ANTENNARIA.

Pappus bristles of the staminate flowers not dilated at tip.
  Heads several, brown.
    Plants without stolons.................................. 1. *A. stenophylla.*
    Plants with surculose stolons........................... 2. *A. leucophaea.*

- Heads solitary.
    - Plants with slender naked stolons........................ 3. *A. flagellaris.*
    - Plants without slender stolons.
        - Pistillate stems 6 to 10 cm. tall........................ 4. *A. latisquama.*
        - Pistillate stems 2 to 3 cm. tall........................ 5. *A. dimorpha.*

Pappus bristles of staminate flowers dilated at tip.

- Plants not stoloniferous.
    - Pistillate heads oblong, the bracts pinkish................ 6. *A. geyeri.*
    - Pistillate heads not oblong, the bracts white or brownish.
        - Pubescence close, silky-woolly........................ 7. *A. luzuloides.*
        - Pubescence floccose-woolly.
            - Stems 5 to 10 cm. high; alpine plant............ 8. *A. lanata.*
            - Stems 25 to 60 cm. high; not alpine.
                - Tips of the bracts not conspicuously papery.. 9. *A. pulcherrima.*
                - Tips of the bracts conspicuously white-papery. 10. *A. anaphaloides.*
- Plants stoloniferous, growing in patches.
    - Heads loosely racemose; inflorescence glandular.......... 11. *A. racemosa.*
    - Heads corymbose; inflorescence not glandular.
        - Leaves 3 to 5 cm. long, oblanceolate or narrowly obovate.
            - Green and glabrate above........................ 12. *A. howellii.*
            - Tomentose on both surfaces........................ 13. *A. concolor.*
        - Leaves much smaller and narrower.
            - Heads 6 to 8 mm. high; bracts white or pink.... 20. *A. parvifolia.*
            - Heads 4 to 7 mm. high.
                - Involucral bracts tinged with green or brown.
                    - Suffrutescent at base; bracts yellowish.. 14. *A. confinis.*
                    - Not suffrutescent; bracts greenish brown.
                        - Leaves densely white-tomentose on both sides........................ 15. *A. media.*
                        - Leaves glabrate above, loosely tomentose beneath................ 16. *A. tomentella.*
                - Involucral bracts white or pink.
                    - Leaves obtuse, white-tomentose; bracts pink........................ 17. *A. concinna.*
                    - Leaves acute, grayish tomentose.
                        - Heads in a dense cluster; bracts pink........................ 18. *A. rosea.*
                        - Heads in a loose corymb; bracts white........................ 19. *A. hendersoni.*

1. Antennaria stenophylla A. Gray, Proc. Am. Acad. **17**: 213. 1882.

Antennaria alpina stenophylla A. Gray in Torr. Bot. Wilkes Exped. 366. 1874.

TYPE LOCALITY: "Spipen [Naches] River." Collected by Pickering & Brackenridge.

RANGE: Washington and Oregon.

SPECIMENS EXAMINED: Wenache Mountains, *Whited* 1345; Ellensburg, *Piper* 2708; *Whited*, April 18, 1898; Pasco, *Hindshaw* 4, May 25, 1896; Kittitas Mountain, *Whited*, May 27, 1896; Spipen River, *Wilkes Expedition;* Hangman Creek, *Sandberg & Leiberg* 51; Medical Lake, *Sandberg & Leiberg*, May, 1893, Spangle, *Piper* 3541; Spokane River, *Wilkes Expedition.*

ZONAL DISTRIBUTION. Arid Transition.

2. Antennaria leucophaea Piper, Bull. Torr. Club **29**: 221. 1902.

TYPE LOCALITY Klickitat, Washington. Collected by Howell.

RANGE: Klickitat County, Washington

SPECIMENS EXAMINED: Klickitat County, *Howell;* near Columbus, *Suksdorf.*

3. **Antennaria flagellaris** (Torr.) A. Gray, Proc. Am. Acad. **17**: 212. 1882.

Antennaria dimorpha flagellaris Torr. Bot. Wilkes Exped. **17**: 366. 1874.

TYPE LOCALITY: "Between Spipen [Naches] River and the north fork of the Columbia, Washington Territory."

RANGE: Washington and Oregon to Montana.

SPECIMENS EXAMINED: Ellensburg, *Piper* 2709; Simcoe Mountains, *Howell* 286; Cleveland, *Suksdorf* 451; Spipen River, *Wilkes Expedition;* Yakima region, *Brandegee* 92, 887; Wenache Mountains, *Cotton* 1396.

ZONAL DISTRIBUTION: Upper Sonoran.

4. **Antennaria latisquama** Piper, Bull. Torr. Club **28**: 41. 1901.

TYPE LOCALITY: Klickitat County, Washington. Collected by Howell.

RANGE: Washington.

SPECIMENS EXAMINED: Klickitat County, *Howell* 417; mountains near Columbus, *Suksdorf*, April 13, 1886; near Fort Colville, *Lyall* in 1861.

5. **Antennaria dimorpha** (Nutt.) Torr. & Gr. Fl. **2**: 431. 1843.

Gnaphalium dimorphum Nutt. Trans. Am. Phil. Soc. **7**: 405. 1841.

TYPE LOCALITY: "On the Black Hills of the Platte."

RANGE: British Columbia to California and Colorado.

SPECIMENS EXAMINED: Wenache, *Whited* 11; Roslyn, *Whited* 419; Rattlesnake Mountains, *Cotton* 309; Pasco, *Piper* 2979; *Hindshaw* 45; Colville, *Lyall* in 1860; Spokane River, *Geyer* 479; Spipen [Naches] River, *Wilkes Expedition;* Pine City, *Piper*, May 6, 1898; Spokane, *Piper* 2296; *Lyall* in 1861; above Wawawai, *Elmer* 101; *Piper*, May 6, 1900; Waitsburg, *Horner* 162.

ZONAL DISTRIBUTION: Arid Transition.

6. **Antennaria geyeri** A. Gray, Pl. Fendl. 107. 1849.

TYPE LOCALITY: "Arid sandy woods near Tshimakaine, Spokan Country," Washington. Collected by Geyer.

RANGE: Washington and Idaho to California and Nevada.

SPECIMENS EXAMINED: Naches River, *Henderson*, August 11, 1892; Falcon Valley, *Suksdorf* 407; *Howell*, August 18, 1882; Mount Adams, *Henderson*, August 14, 1882; Spokane, *Kreager* 173; near Tshimakaine, *Geyer* 542.

ZONAL DISTRIBUTION: Arid Transition.

7. **Antennaria luzuloides** Torr. & Gr. Fl. **2**: 430. 1843.

TYPE LOCALITY: "Oregon or Rocky Mountains." Collected by Douglas or by Drummond.

RANGE: British Columbia to Wyoming and Oregon.

SPECIMENS EXAMINED: Ellensburg, *Whited* 399; Falcon Valley, *Suksdorf* 406; between Thorp and Clealum, *Whited* 399; Pend Oreille River, *Lyall* in 1861; without locality, *Vasey* in 1889; Sprague, *Sandberg & Leiberg* 177; without locality, *Wilkes Expedition;* Pullman, *Piper* 1512; Blue Mountains, *Horner* 610.

ZONAL DISTRIBUTION. Arid Transition.

8. **Antennaria lanata** (Hook.) Greene, Pittonia **3**: 288, 1898.

Antennaria carpathica lanata Hook. Fl. Bor. Am. **1**: 329. 1833.

TYPE LOCALITY. "Swamps of the plains among the Rocky Mountains." Collected by Drummond.

RANGE: British Columbia to California and Colorado.

SPECIMENS EXAMINED: Olympic Mountains, *Elmer* 2422; Mount Rainier, *Allen* 289; *Piper* 527, 2162; *Tolmie;* Cascade Mountains, latitude 49°, *Lyall* in 1859; Mount Adams, *Henderson*, August 10, 1892; *Flett* 1094; Skagit Pass, *Lake & Hull*, August 24, 1892; Nason Creek, *Sandberg & Leiberg* 833.

ZONAL DISTRIBUTION. Arctic.

9. Antennaria pulcherrima Greene, Pittonia 3: 176. 1897.

Antennaria carpathica pulcherrima Hook. Fl. Bor. Am. 1: 329. 1833.

Type locality: "Swamps of the plains among the Rocky Mountains."

Range: British Columbia and Alberta to Oregon and New Mexico.

Specimens examined: Wenache Mountains, *Elmer*, 452; Pullman, *Elmer*, June, 1897.

Zonal distribution: Arid Transition.

10. Antennaria anaphaloides Rydberg, Mem. N. Y. Bot. Gard. 1: 409. 1900.

Type locality: Spanish Basin, Montana.

Range: Washington to Montana.

Specimens examined: Upper Naches, *Henderson*, June 15, 1892; Cleman Mountain, *Henderson* 2284; Similkameen, *Lyall* in 1860; Yakima County, *Henderson* 2284; Wenache Mountains, *Cotton* 1307.

Zonal distribution: Arid Transition.

11. Antennaria racemosa Hook. Fl. Bor. Am. 1: 330. 1833.

Antennaria piperi Rydberg, Bull. Torr. Club 28: 21. 1901.

Type locality: "Alpine woods of the Rocky Mountains."

Range: British Columbia and Alberta to Oregon and Wyoming.

Specimens examined: Clallam County, *Elmer* 2420; Nisqually sources, *Allen* 224; Cascade Mountains, latitude 49°, *Lyall* in 1859; Pend Oreille River, *Lyall* in 1861; Peshastin, *Sandberg & Leiberg* 484; Klickitat River, *Flett* 1105; Wenache Mountains, *Whited* 1261; Roslyn, *Whited* 419; Clealum, *Henderson*, June 11, 1892; Kamiak Butte, *Elmer* in 1897; *Piper*, July 20, 1890; Mount Carlton, *Kreager* 227; without locality, *Vasey* in 1889; Mount Storm King, *Lawrence* 329, 330; Olympic Mountains, *Piper* in 1895.

Zonal distribution: Canadian.

12. Antennaria howellii Greene, Pittonia 3: 276. 1898.

Type locality: St. Helens, Oregon (not "Mt. St. Helen"). Collected by Howell.

Range: British Columbia to Montana and Oregon.

Specimens examined: Olympic Mountains, *Elmer* 2423; Mason County, *Kincaid*, June 15, 1892; upper Nisqually Valley, *Allen*; Tacoma, *Flett* 103; near Mount Adams, *Henderson* 2289; west Klickitat County, *Suksdorf* 2109; Falcon Valley, *Suksdorf* 404; Pend Oreille River, *Lyall* in June, 1861; Spokane, *Piper* 2942; Spangle, *Piper* 3539; Blue Mountains, *Horner* 171.

Zonal distribution: Transition.

This species was formerly referred to *A. plantaginifolia* (L.) Hook. of the Eastern States.

13. Antennaria concolor sp. nov.

Cespitose, the ligneous rootstocks and stolons slender; stems slender, erect, 20 to 30 cm. high, sparsely tomentose; basal leaves thin, spatulate, 2.5 to 3.5 cm. long, whitish, abruptly acuminate, concave on the lateral margins, the greener upper side becoming nearly glabrous the second season; cauline 7 to 9, linear or linear-lanceolate; inflorescence of 4 to 7 short-peduncled heads in a corymb; involucre 8 to 9 mm. high; bracts in about 3 ranks, mostly acute, greenish below, fuscous in the middle, the tips paler or white.

Type specimens collected by the writer in open places in fir woods near the suburb of Portland, Oreg., known as Mount Scott, June 6, 1904, no. 6189. A few colonies only were found, all pistillate.

The species is perhaps nearest to *A. howellii* Greene, which was abundant in the same locality, but that has larger and thicker leaves, nearly always smooth and green above with the lateral margins nearly straight and with the heads usually sessile.

I would also refer to this species no. 485, G. R. Vasey, collected in the Cascade Mountains, probably near Ellensburg, Wash., in 1889. This was referred doubtfully by Nelson (Proceedings U. S. National Museum 33:713) to *A. pedicellata* Greene, but that has a glandular inflorescence. The Vasey specimen differs from the type of *A. concolor* only in that the stems are somewhat stouter, the leaves thicker and less suddenly narrowed into the petiole and the heads shorter-pedicelled.

14. **Antennaria confinis** Greene, Pittonia **4**: 40. 1899.

Type locality: Santa Catalina Mountains, Arizona.

Range: Washington to Arizona.

Specimens examined: Wenache Mountains, *Whited* 1262; *Cotton* 1280; Rattlesnake Mountains, *Cotton* 1280.

Zonal distribution: Arid Transition.

15. **Antennaria media** Greene, Pittonia **3**: 286. 1898.

Type locality: "Mountains above Coldstream, Placer Co., California."

Range: British Columbia and Alberta to California and Colorado.

Specimens examined: Olympic Mountains, *Piper*, August, 1895; *Elmer* 2421; Mount Rainier, *Allen* 141; Mount Adams, *Henderson*, August, 1892; *Flett* 1180; Yakima region, *Brandegee* 886.

Zonal distribution: Arctic.

This species was formerly confused with the European *A. alpina* (L.) Gaertn.

16. **Antennaria tomentella** E. Nelson, Proc. U. S. Nat. Mus. **23**: 701. 1901.

Type locality: "Near Stevens Pass, Cascade Mountains, Washington." Collected by Sandberg & Leiberg.

Range: Cascade Mountains, Washington.

Specimens examined: Stevens Pass, *Sandberg & Leiberg* 751; Mount Adams, *Cotton* 1517.

17. **Antennaria concinna** E. Nelson, Proc. U. S. Nat. Mus. **23**: 705. 1901.

Type locality: "Olympic Mountains, Clallam County, Washington."

Range: Washington, Oregon, Utah.

Specimens examined: Clallam County, *Elmer* 2417; Mount Storm King, *Lawrence* 350; Olympic Mountains, *Piper* 2191.

Zonal distribution: Hudsonian.

18. **Antennaria rosea** Greene, Pittonia **3**: 281. 1898.

Antennaria dioica rosea D. C. Eaton; S. Wats. Bot. King. 186. 1871, nom. nud.

Type locality: North Park, Colorado, collected by C. S. Sheldon.

Range: British Columbia to Alberta, Colorado, and California.

Specimens examined: Mount Rainier, *Piper* 2161; Mount Adams, *Henderson* 2288; Goose Lake, *Flett* 1095; west Klickitat County, *Suksdorf* 2190; Ellensburg, *Elmer* 398; Mountains north of Ellensburg, *Whited* 661; Sprague, *Sandberg & Leiberg* 213; Loomis, *Elmer* 372; Spangle, *Piper*, June 24, 1899; Spokane, *Henderson* 2286; *Piper* 2273; Cheney, *Tucker*, in 1890; without locality, *Vasey* 484, 487.

Zonal distribution: Arid Transition.

18a. **Antennaria rosea angustifolia** (Rydberg) E. Nelson, Proc. U. S. Nat. Mus. **23**: 706. 1901.

Antennaria angustifolia Rydberg, Bull. Torr. Club **26**: 546. 1899.

Type locality: Yosemite Valley, California.

Range: Washington to California.

Specimens examined: Olympic Mountains, *Piver* 2192; Mount Baldy, *Conard* 394.

19. **Antennaria hendersoni** Piper, Bull. Torr. Club **29**: 221. 1902.

Type locality: Mount Adams, Washington, collected by Henderson.

Range: Washington.

Specimens examined: Mount Adams, *Henderson* 2290 July 3, 1892; *Flett* 1078.

20. **Antennaria parvifolia** Nutt. Trans. Am. Phil. Soc. **7**: 406. 1841.

Antennaria aprica Greene, Pittonia **3**: 282. 1898.

Type locality: "On the Black Hills and plains of the upper part of the Platte." Collected by Nuttall.

Range: Washington to Manitoba, south to New Mexico and Nebraska.

Specimens examined: Yakima Region, *Brandegee* 883 in part; Spokane, *Piper* 2297, 2298; Spokane, *Kreager* 174.

Zonal distribution: Arid Transition

ANAPHALIS.

1a. Anaphalis margaritacea occidentalis Greene, Fl. Fran. 399. 1897.

Type locality: Sand hills of the seaboard at least from Middle California to Alaska.

Range: Alaska to California.

Specimens examined: Cascade Mountains, latitude 49°, *Lyall* in 1859; Seattle, *Piper*; Silverton, *Bouck* 103; Goose Lake, *Flett* 1096; Tacoma, *Flett* 129; Tieton River, *Cotton* 445; North Yakima, *Watt*, August, 1895; Roslyn, *Whited* 467; along Twisp River, *Whited* 204; Lake Chelan, *Lake & Hull* 744; Bridge Creek, *Elmer* 634; without locality, *Vasey* 488; Mount Carlton, *Kreager* 223; Fish Lake, *Dunn*, August, 1900; Atanum Soda Springs, *Watt*, August, 1895.

Zonal distribution: Transition.

1b. Anaphalis margaritacea subalpina A. Gray, Syn. Fl. 1^2: 233. 1884.

Type locality: "Mountains of Colorado."

Range: Washington to Colorado.

Specimens examined: Snoqualmie Falls, *Piper* 676; Peshastin, *Sandberg & Leiberg* 511; Mount Stuart, *Elmer* 1177· Stuart Island, *Lawrence* 155.

GNAPHALIUM.

Bristles of the pappus united at base; involucre brownish.......... 1. *G. purpureum.*
Bristles of the pappus separated at base.
Plants low; flowers in dense leafy clusters; involucres very woolly.
Bracts white; plants loosely-woolly.......................... 2. *G. palustre.*
Bracts brownish; plants appressed-woolly................ 3. *G. uliginosum*
Plants tall; flowers in looser, leafless clusters; involucres woolly only at base.
Glandular; leaves green above........................... 4. *G. decurrens.*
Not glandular; leaves white-woolly.
Involucre white; cymes loose......................... 5. *G. microcephalum.*
Involucre yellowish; cymes dense.................... 6. *G. chilense.*

1. Gnaphalium purpureum L. Sp. Pl. 2: 854. 1753.

Type locality: "In Carolina, Virginia, Pennsylvania."

Range: Throughout the most of the United States, Mexico, South America.

Specimens examined: Montesano, *Heller* 3919; Seattle, *Piper*, July, 1895; Tacoma, *Flett* 72; west Klickitat County, *Suksdorf* 1580.

Zonal distribution: Humid Transition.

2. Gnaphalium palustre Nutt. Trans. Am. Phil. Soc. 7: 404. 1840.

Gnaphalium gossypinum Nutt. Trans. Am. Phil. Soc. 7: 404. 1840.

Type locality: "Rocky Mountains, Oregon, California, and Chile."

Range: Washington to Wyoming, south to California and Arizona.

Specimens examined: Montesano, *Heller* 4014; west Klickitat County, *Suksdorf* 2070, 655, 653, 654, 2080; mouth of Columbia, *Nuttall*; Wenache, *Whited* 242; Ellensburg, *Whited* 696, 496; North Yakima, *Watt*, August, 1895; Crab and Wilson creeks, *Sandberg & Leiberg* 284; Rock Lake, *Lake & Hull*, August 3, 1892; Spokane, *Henderson*, July 9, 1892; Pullman, *Piper* 1583; Almota, *Piper* 2735; Mount Carlton, *Kreager* 177.

Zonal distribution: Transition and Upper Sonoran.

3. Gnaphalium uliginosum L. Sp. Pl. 2: 856. 1753.

Type locality: European.

RANGE: British Columbia to Oregon. Asia. Europe.

SPECIMENS EXAMINED: Whatcom County, *Suksdorf* 975; Fairhaven, *Piper*; west Klickitat County, *Suksdorf* 127, 656; Manor, *Piper*, July 10, 1899; Kalama, *Piper*, October 30, 1901.

ZONAL DISTRIBUTION: Humid Transition.

4. **Gnaphalium decurrens californicum** (DC.) A. Gray, Bot. Cal. **1**: 341. 1876.

Gnaphalium californicum DC. Prod. **7**: 224. 1865–8.

TYPE LOCALITY: California.

RANGE: Washington and Idaho to California.

SPECIMENS EXAMINED: Cascade Mountains, latitude 49°, *Lyall* in 1859; Falcon Valley, *Suksdorf* 33; Mount Adams, *Flett* 1067; Kittitas County, *Sandberg & Leiberg* 700; Pend Oreille River, *Lyall* in 1861.

ZONAL DISTRIBUTION: Arid Transition and Canadian.

5. **Gnaphalium microcephalum** Nutt. Trans. Am. Phil. Soc. **7**: 404. 1840.

TYPE LOCALITY: "St. Diego, Upper California."

RANGE: British Columbia to Idaho and California.

SPECIMENS EXAMINED: Port Ludlow, *Binns*, August 15, 1890; Port Townsend, *Edwards* 33; Anacortes, *Henderson*, July 5, 1892; Tacoma, *Flett* 138; upper Nisqually Valley, *Allen* 223; Peshastin, *Sandberg & Leiberg* 830; Leavenworth, *Savage* 25; *Whited* 245; Tumwater Canyon, *Whited* 1458; Spokane, *Piper*, August 28, 1898; Newport, *Kreager* 454.

ZONAL DISTRIBUTION: Transition.

6. **Gnaphalium chilense** Spreng. Syst. **3**: 480. 1826.

Gnaphalium sprenglii Hook. & Arn. Bot. Beech. Voy. 150. 1838.

Gnaphalium luteo-album occidentale Nutt. Trans. Am. Phil. Soc. **7**: 403. 1841.

TYPE LOCALITY: California. There collected by Chamisso, but the specimens erroneously attributed to Chile.

RANGE: Washington to California and Texas.

SPECIMENS EXAMINED: Seattle, *Piper* 1076; North Yakima, *Watt*, August, 1895; *Piper* 1786; Lake Chelan, *Lake & Hull* 745; Pullman, *Piper*, October 5, 1897; Waitsburg, *Horner* 412; Alma, *Elmer* 544; Toppenish, *Cotton* 777, Prosser, *Cotton* 896.

ZONAL DISTRIBUTION: Transition.

ADENOCAULON.

1. **Adenocaulon bicolor** Hook. Bot. Misc. **1**: 19. *t. 15*. 1830.

TYPE LOCALITY: "In sylvis densis apud Fretum de Fuca, atque prope Fort Vancouver ad flumen Columbiae, in ora occidentali Americae Septentrionalis" Collected by Scouler.

RANGE: British Columbia to California and east to Lake Superior.

SPECIMENS EXAMINED: Cascade Mountains, latitude 49°, *Lyall* in 1859; Olympic Mountains, *Edwards* in 1889; Silverton, *Bouck* 87; Seattle, *Piper*, July, 1891; upper Nisqually Valley, *Allen* 12; Peshastin, *Sandberg & Leiberg* 598; Stehekin, *Whited* 1400; Maxfield, *Henderson*, June 22, 1892, Skagit Pass, *Lake & Hull* 806; Railroad Creek, *Elmer* 859; without locality, *Vasey* 490; without locality, *Geyer* 523; Mount Carlton, *Kreager* 214.

ZONAL DISTRIBUTION: Humid Transition.

PSILOCARPHUS.

Heads covered with long loose woolly hairs.
  Erect, 6 to 15 cm. high; heads sparsely woolly .... 1. *P. elatior.*
  Dwarf; heads very woolly .... 2. *P. brevissimus.*
Heads covered with short close wool.
  Prostrate; leaves oblong or elliptic............................ 3. *P. tenellus.*
  Ascending; leaves narrowly oblanceolate........................ 4. *P. oreganus.*

1. **Psilocarphus elatior** A. Gray, Syn. Fl. ed. 2. 1^2: 448. 1886.
Psilocarphus oreganus elatior A. Gray, Bot. Cal. 1: 336. 1876.
Type locality: Portland, Oregon.
Range: Washington, Oregon, and Idaho.
Specimens examined: Seattle, *Piper* 1125; west Klickitat County, *Suksdorf* 1573; Manor, *Piper* 3079; Pullman, *Piper*, September 30, 1897; Blue Mountains, *Horner* 336; Coulee City, *Piper* 3904; Vancouver, *Piper* 5024.
Zonal distribution: Transition.

2. **Psilocarphus brevissimus** Nutt. Trans. Am. Phil. Soc. 7: 340. 1840.
Type locality: "Plains of the Oregon River, in inundated tracts." Collected by Nuttall.
Range: Washington to California.
Specimens examined: Coulee City, *Piper* 3904½.
Zonal distribution: Arid Transition.

3. **Psilocarphus tenellus** Nutt. Trans. Am. Phil. Soc. 7: 341. 1840.
Type locality: Santa Barbara, California.
Range: British Columbia to California.
Specimens examined: Fairhaven, *Suksdorf*, July 15, 1890.

4. **Psilocarphus oreganus** Nutt. Trans. Am. Phil. Soc 7: 341. 1840.
Type locality: "Near the Oregon and outlet of the Wahlamet." Collected by Nuttall.
Range: Oregon, Washington, and Idaho.
Specimens examined: Klickitat County, *Suksdorf* 32; *Howell* 284; Spokane County, *Suksdorf* 932, 931; Coulee City, *Piper*.

Nuttall's type in the Gray Herbarium agrees with his description and is the plant understood by Dr. Gray. There is evidently some error in regard to the type locality, as the only species found in recent years near the mouth of the Willamette is *P. elatior* Gray.

CENTAUREA.

Bracts of the involucre each tipped with a slender spine; rays yellow; pappus of unequal bristles .... 1. *C. melitensis.*
Bracts of the involucre spineless, all more or less fimbriate.
  Annual; rays red, blue, white, or violet; pappus present .... 2 *C. cyanus.*
  Perennial; rays red; pappus none .... 3. *C. consimilis.*

1. **Centaurea melitensis** L. Sp. Pl. 2: 917. 1753.
Type locality: "In Melita."
Specimens examined: Whidby Island, *Gardner* 161; Port Townsend, *Edwards* in 1896; Seattle, *Piper*, September, 1898.

2. **Centaurea cyanus** L. Sp. Pl. 2: 911. 1753. **Corn flower.**
Type locality: Europe.
Specimens examined: Wenache, *Whited* 1270.

3. **Centaurea consimilis** Boreau, Fl. Centr. Fr. ed. 3. 2: 351. 1857.
Type locality: Angers, France.
Specimens examined: Pullman, *Hardwick* 2390.

CNICUS.

1. **Cnicus benedictus** L. Sp. Pl. 2: 826. 1753. **Blessed thistle.**
Centaurea benedicta L. Sp. Pl. ed. 2. 2: 1296 1763.
Type locality: "In Chio, Lemus, Hispania."
Specimens examined: Waitsburg, *Horner* 166; Colfax, *Piper*, June 28, 1901.

SILYBUM.

1. **Silybum marianum** (L.) Gaertn. Fruct. & Sem. **2**: 378. 1802. MILK THISTLE.
Carduus mariana L. Sp. Pl. **2**: 823. 1753.
TYPE LOCALITY: "In Angliae, Galliae, Italiae aggeribus ruderatis."
SPECIMENS EXAMINED: Pullman, *Piper* in 1902; Vancouver, *Piper* in 1904.

CARDUUS. THISTLE.

Dioecious; heads small; perennial by spreading roots .... 1. *C. arvensis.*
Hermaphrodite; heads larger; biennials.
Bracts of the involucre all with dilated fringed tips.............. 2. *C. americanus.*
Bracts of the involucre or some of them with spiny tips.
Outer and inner bracts all with spiny tips.................... 3. *C. lanceolatus.*
Outer bracts spine-tipped; inner ones unarmed.
Involucre loose, the outer bracts nearly or quite as long as the inner.
Heads clustered, short-peduncled; flowers pink..... 4. *C. edulis.*
Heads few, long-peduncled; flowers cream-color.... 5. *C. remotifolius.*
Involucre close, the outer bracts much shorter than the inner.
Heads clustered, subsessile, leafy; bracts herbaceous, not glandular on the back .... 6. *C. foliosus.*
Heads not clustered, peduncled; bracts coriaceous, glandular on the back.
Outer bracts with spines nearly as long........ 7. *C. ochrocentrus.*
Outer bracts with much shorter spines.
Leaves canescent on both sides; flowers usually pink......................... 8. *C. undulatus.*
Leaves green above; flowers whitish...... 9. *C. palousensis.*

1. **Carduus arvensis** (L.) Robs. Brit. Fl. 163. 1777. CANADA THISTLE.
Serratula arvensis L. Sp. Pl. **2**: 820. 1753.
Cnicus arvensis Hoffm. Deutschl. Fl. ed. 2. **1**^{2}: 130. 1804.
Cirsium arvense Scop. Fl. Carn. ed. 2. **2**: 126. 1772.
TYPE LOCALITY: European.
SPECIMENS EXAMINED: Pullman, *Piper*, July 1, 1895; Tacoma, *Piper*.

The Canada thistle is now well established in various places in Washington, but it produces good seed only exceptionally, and therefore its spread is slow.

2. **Carduus americanus** (A. Gray) Rydberg, Bull. Torr. Club **28**: 508. 1901.
Cnicus carlinoides americanus A. Gray, Proc. Am. Acad. **10**: 48. 1874.
Cnicus americanus A. Gray, Proc. Am. Acad. **19**: 56. 1883.
TYPE LOCALITY: "Rocky Mountains of Colorado."
RANGE: Washington to California and New Mexico.
SPECIMENS EXAMINED: Seattle, *Piper* in 1888; Goose Lake, *Flett* 1097.

3. **Carduus lanceolatus** L. Sp. Pl. **2**: 821. 1753. BULL THISTLE.
Cnicus lanceolatus Willd. Prod. Fl. Berol. 259. 1787.
Cirsium lanceolatum Scop. Fl. Carn. ed. 2. **2**: 130. 1772.
TYPE LOCALITY: European.
SPECIMENS EXAMINED: Pullman, *Piper*, August, 1897; abundant in western Washington.

4. **Carduus edulis** (Nutt.) Greene, Proc. Acad. Phila. **1892**: 362. 1893.
Cirsium edule Nutt. Trans. Am. Phil. Soc. **7**: 420. 1841.
Cnicus edulis A. Gray Proc. Am. Acad. **10**: 47. 1874.
TYPE LOCALITY: "The plains of Oregon and the Blue Mountains" Collected by Nuttall.

Range: British Columbia to Idaho and California.

Specimens examined: Montesano, *Heller* 4000, 3963; Cascade Mountains, latitude 79°, *Lyall* in 1859; Sumas Prairie, latitude 49°, *Lyall* in 1858; Seattle, *Piper*, August, 1892; Mount Rainier, *Piper* 2152; Beaver Creek, *Whited* 24; Nason Creek, *Sandberg & Leiberg* 695; Conconnully, *Whited* 1315; west Klickitat County, *Suksdorf* 143, 144; Ellensburg, *Whited* 660; Blue Mountains, *Horner* 330.

Zonal distribution: Transition.

The roots of this species were formerly used by the natives as food.

5. **Carduus remotifolius** Hook. Fl. Bor. Am. **1**: 302. 1833.

Cnicus remotifolius A. Gray, Proc. Am. Acad. **10**: 47. 1875.

Cirsium remotifolium DC. Prod. **6**: 655. 1837.

Type locality: "In the valley of the Columbia." Collected by Douglas.

Range: Washington to California.

Specimens examined: West Klickitat County, *Suksdorf* 145; Mount Adams, *Suksdorf* 574; Yakima region, *Brandegee* 922; Nason Creek, *Sandberg & Leiberg* 626; Fourth Plain, *Piper*, July 10, 1899; Cape Horn, *Piper* 4963.

Zonal distribution: Humid Transition.

6. **Carduus foliosus** Hook. Fl. Bor. Am. **1**: 303. 1833.

Cnicus foliosus Gray, Proc. Am. Acad. **10**: 40. 1874.

Cirsium foliosum DC. Prod. **6**: 654. 1837.

Type locality: "Prairies of the Rocky Mountains." Collected by Drummond.

Range: Washington and Oregon to Alberta.

Specimens examined: Pullman, *Piper* 1822 and June, 1893; *Henderson* 4275; without locality, *Vasey* 475.

Zonal distribution: Arid Transition.

7. **Carduus ochrocentrus** (A. Gray) Greene, Proc. Acad. Phila. **1892**: 336. 1893.

Cirsium ochrocentrum A. Gray, Pl. Fendl. 110. 1849.

Type locality: "Mountain sides around Santa Fe," New Mexico.

Range: Washington to California and Texas.

Specimens examined: Blue Mountains, *Piper* in 1896.

8. **Carduus undulatus** Nutt. Gen. **2**: 130. 1818.

Cnicus undulatus A. Gray, Proc. Am. Acad. **10**: 42. 1875.

Cirsium douglassii DC. Prod. **6**: 643. 1837.

Cirsium undulatum Spreng. Syst. **3**: 374. 1826.

Type locality: "On the calcareous islands of Lake Huron and on the plains of upper Louisiana."

Range: Washington to Canada, south to New Mexico.

Specimens examined: Klickitat River, *Suksdorf* 142; Columbia Valley, *Lyall* in 1860; Yakima County, *Henderson* 2274, Wenache, *Whited* 91, 1173, 1271, Spokane, *Piper*, July, 1896, Almota, *Piper* 1823, Wawawai, *Hull*, June, 1892; Rattlesnake Mountains, *Cotton* 712

Zonal distribution Upper Sonoran.

9. **Carduus palousensis** sp. nov.

Perennial, stems erect, usually loosely branched above, 30 to 90 cm. high, tomentose when young, becoming glabrous; leaves lanceolate in outline, pinnatifid into 3 to 7 pairs of entire or toothed lobes, early becoming green and glabrous above, persistently white-woolly beneath, 5 to 15 cm. long, bearing but few prickles, the uppermost commonly simple, head 3 to 4 cm high, often on long nearly naked peduncles, involucre hemispheric, its bracts firm, closely imbricated in several successively shorter ranks, not ciliolate, all but the innermost prickly-pointed, each bearing an oblong or linear glandular spot near the tip, innermost attenuate-acuminate and feebly armed or muticous, flowers yellowish white; corolla lobes shorter than the throat; pappus bristles somewhat clavellate at tip; anther tips acute.

This species was erroneously referred to *C. breweri* (Gray) Greene in the Flora of the Palouse region.

Specimens have been examined as follows: Silver Lake, *Henderson* 2277; Ellensburg, *Whited* 558, 857; Pullman, *Elmer* 99; *Piper* 1589 (type); without locality, *Vasey* 477, 478, Waitsburg, *Horner* 303.

ARCTIUM.

1. **Arctium minus** Schk. Bot. Handb. **3**: 49. 1803. BURDOCK.

TYPE LOCALITY: Germany.

SPECIMENS EXAMINED: Seattle, *Piper*.

SAUSSUREA.

1. **Saussurea americana** D. C. Eaton, Bot. Gaz. **6**: 283. 1881.

TYPE LOCALITY: "Mountains of Union Co., Oregon." Collected by Cusick.

RANGE: Washington, Oregon, and Idaho.

SPECIMENS EXAMINED: Olympic Mountains, *Piper* 2188, 930; Mount Rainier, *Piper* 2141; Mount Adams, *Suksdorf* 573; Simcoe Mountains, *Howell;* Monte Cristo, ***Misses Coffin & Goodspeed;*** without locality, *Vasey* 550.

ZONAL DISTRIBUTION: Canadian and Hudsonian

ADDENDA.

While the preceding pages have been in press several papers by Mr. W. N. Suksdorf dealing with Washington plants have been issued, as follows: Washingtonische Pflanzen II, Allgemeine Botanische Zeitschrift, vol. 12, pages 5 to 7, 26 to 27, and 42 to 43, 1906; Neue Pflanzen aus Washington I, West American Scientist, vol. 15, pages 58 to 61, 1906. Material for only a few of many new species and subspecies proposed has been available for examination.

Calamagrostis anomala Suksdorf, Allg. Bot. Zeitscn. **12**: 43. 1906. Mount Adams. Related to *C. scribneri* Beal, but believed to be distinct.

Festuca reflexa Buckl. Proc. Acad. Phila. **1862**: 98. 1863.
This has recently been collected by Mr. Suksdorf near Bingen. It may be distinguished from *C. pacifica* Piper by the 1 to 3-flowered spikelets which are all divaricate.

Festuca myuros L. Sp. Pl. **1**: 74. 1753.
Lake Washington, Suksdorf, July 3, 1890. Easily distinguishable from *F. megalura* Nutt. by the absence of the cilia from the lemma.

Quamasia azurea Heller, Bull. Torr. Club **26**: 547. 1899.
The only character adduced to distinguish this from *Q. quamash* is the blue color of the flowers, an insufficient distinction in our opinion.

Corallorhiza multiflora sulphurea Suksdorf, Allg. Bot. Zeitsch. **12**: 42. 1906. Bingen.

Corallorhiza leimbachiana Suksdorf, op. cit. 42. Bingen.
Both of these are close allies of *C. multiflora*.

Piperia transversa Suksdorf, op. cit. 43. Bingen.

Ranunculus occidentalis laevicaulis Suksdorf, West Am. Sci. **15**: 58. 1906.
Characterized by having the stems glabrous instead of pilose, as in *R. occidentalis* Nutt.

Physaria alpestris Suksdorf, op. cit. 58.
A new species from Mount Adams.

Saxifraga paddoensis Suksdorf, op. cit. 59.
From Mount Adams, said to be related to *S. punctata* L.

Saxifraga fragosa leucandra Suksdorf, op. cit. 60. Bingen.

Saxifraga bracteosa leptopetala Suksdorf, op. cit. 60. Bingen.

Saxifraga bracteosa micropetala Suksdorf, op. cit. 60. Bingen.

Lithophragma tenella ramulosa Suksdorf, op. cit. 61. Bingen.

Lithophragma tenella florida, Suksdorf, op. cit. 61. Bingen.

Vicia washingtonensis Suksdorf, op. cit. 59.
Based on specimens collected on cliffs near Bingen.

Sanicula tripartita Suksdorf, Allg. Bot. Zeitschr. **12**: 5. 1906.
A new species closely related to *S. menziesii*, but distinguished by the larger fruit, which has only a very short stipe. The type is from Bingen, Klickitat County. Seattle specimens, *Piper* 643, seem also to be referable to this species.

Steironema ciliatum occidentale Suksdorf, op. cit. 26. Bingen.
Said to be distinguishable from *S. ciliatum* Raf. by having shorter-petioled, less acute leaves.

Navarretia propinqua Suksdorf, op. cit. 26. Spokane County and Falcon Valley.
A new species very close to *N. intertexta*, but with more dissected leaves, corolla shorter than calyx, and the style only half as long as the stamens.

Ilysanthes gratioloides depressa Suksdorf, op. cit. 61. Bingen.

Orthocarpus rarior Suksdorf, op. cit. 27. Falcon Valley and Spokane County.
A close ally of *O. hispidus*, from which it is said to differ by having a bright yellow corolla and obtuse capsules, besides being less pubescent.

Aphyllon inundatum Suksdorf, op. cit. 27. Bingen.
Allied to *A. uniflorum*. Its host plant is *Coreopsis atkinsoniana* Dougl.

Aphyllon arenosum Suksdorf, op. cit. 27. Type from Bingen.
The western plants referred to *A. ludovicianum* are considered to represent a distinct species.

Plectritis congesta alba Suksdorf, op. cit. 6. Bingen.
A white-flowered subspecies or form of *Valerianella congesta*.

Aligera macroptera obtusa Suksdorf, op. cit. 6. Bingen.

Antennaria rhodantha Suksdorf, op. cit. 6. Skamania County.
A new species unknown to us, apparently allied to *A. rosea*.

Anaphalis margaritacea revoluta Suksdorf, op. cit. 7. Skamania County.
Said to be distinguishable by having small linear revolute leaves.

BIBLIOGRAPHY.

The following is a list of publications relating wholly or largely to the flora of Washington:

Allen, Edward F. The Western hemlock. Bulletin 33, Bureau of Forestry, U. S. Department of Agriculture. 1902.

Contains also a list of the trees of Washington and Oregon.

Ayers, H. B. Washington Forest Reserve. Nineteenth Annual Report, U. S. Geological Survey, pt. 5. 283–313. 1898.

Contains notes on the forest trees of the region.

Cooper, J. G. Report on the medical flora of Washington Territory. Transactions American Medical Association **10:** 221–237. 1857.

——— Catalogue of plants collected in Washington Territory. Pacific Railroad Reports **12**^{2}: 50–71. 1860.

Contains list of plants collected by Cooper, Gibbs, and Suckley, mostly identfied by Gray or by Torrey.

——— The sylva of Montana. American Naturalist **3:** 405–422. 1870.

Includes notes on Washington trees.

Cotton, John S. Three new plants from Washington. Bulletin Torrey Botanical Club **29:** 573. 1902.

Describes *Glyceria latifolia*, *Astragalus olympicus*, and *Orthocarpus barbatus*.

——— A report on the range conditions of central Washington. Bulletin 60, Washington Agricultural Experiment Station. 1904.

Contains economic references to many plants.

Coues, Elliott. Notes on Mr Thomas Meehan's paper on the Plants of Lewis and Clark's Expedition across the continent, 1804–1806. Proceedings Academy Natural Sciences, Philadelphia **1898:** 291–315. 1898.

——— History of the expedition under the command of Lewis and Clark.

Contains references to many Washington plants, with detailed notes on the more important economic ones. These notes are all by Lewis.

Dodwell, Arthur, and Rixon, Theodore. Olympic Forest Reserve. Twenty-first Annual Report, U. S. Geological Survey, pt. 5. 145–209. 1900.

Contains notes on forest trees.

Elmer, A. D. E. New Western plants. Botanical Gazette **36:** 52–61. 1903.

Includes eleven proposed new species from Washington.

——— An extension of range for *Woodwardia radicans*. Fern Bulletin **7:** 9–10. 1899.

Flett, J. B. Some Washington ferns. Fern Bulletin **8:** 40–41. 1900.

——— Notes on some rare Washington ferns. Fern Bulletin **10**. 24-25. 1902.

——— The fern flora of Washington. Fern Bulletin **11:** 79–85. 1903.

Gannett, Henry. Forest conditions and standing timber in Washington. Nineteenth Annual Report, U. S. Geological Survey, pt. 5. 26-42. 1898.

Has plates showing percentage compositions of forests in western Washington as regards red fir, western hemlock, cedar, and spruce.

Gannett, Henry. The forests of Washington. Professional Paper no. 5. series H. Forestry 2. U. S. Geological Survey, 1902.

A detailed account of the merchantable timber in each county of the State and a map showing relative density of stand.

Geyer, Charles H. Notes on the vegetation and general character of the Missouri and Oregon Territories, made during botanical journey from the State of Missouri across the south pass of the Rocky Mountains to the Pacific, during the years 1843 and 1844. London Journal of Botany **4**: 479–492, 653–662. 1845; **5**: 22–41, 198–208, 285–310, 509–524. 1846.

Gorman, Martin W. Eastern part of Washington Forest Reserve. Nineteenth Annual Report, U. S. Geological Survey, pt. 5. 315–350. 1890.

Refers to many plants, especially trees and shrubs.

Griffiths, David. Forage conditions and problems in eastern Washington, eastern Oregon, northeastern California, and northwestern Nevada. Bulletin 38, Bureau of Plant Industry, U. S. Department of Agriculture, 1903.

Incidentally mentions a considerable number of Washington plants.

Henderson, L. F. The Flora of the Olympics. Zoe **2**: 253–295. 1891.

Gives list of species observed or collected in these mountains.

Holzinger, John M. Report on a collection of plants made by J. H. Sandberg and assistants in northern Idaho in the year 1892. Contributions from U. S. National Herbarium **3**: 205–287. 1895.

Mentions several Washington plants, mainly from Spokane and Kamiak Butte.

Hooker, J. D. Account of the botanical collections made by David Lyall, R. N., F. L. S., surgeon and naturalist to the North American Boundary. Journal of the Linnæan Society **7**: 124–144. 1864.

Hooker, W. J. A brief memoir of the life of Mr. David Douglas with extracts from his letters. Companion to the Botanical Magazine **2**: 79–182. 1836.

Contains many notes and references to northwestern plants by Douglas. This paper is reprinted in volume 5 of the Quarterly of the Oregon Historical Society.

——— Catalogue of Mr. Geyer's collection of plants gathered in the upper Missouri, the Oregon Territory, and the intervening portion of the Rocky Mountains. London Journal of Botany **6**: 65–79, 206–256. 1847. Hooker's Journal of Botany and Kew Garden Miscellany **3**: 287–300. 1851; **5**: 257–265. 1853; **7**: 371–378. 1855, **8**: 16–19. 1856.

——— and Arnott, G. A. Walker. The botany of Captain Beechey's voyage to the Pacific and Bering Strait in the years 1825–1828. London, 1830–41.

In the supplement are described numerous plants collected by Douglas and by Tolmie The "Snake Country" specimens were gathered in the summer of 1837 by a friend of Mr Tolmie, who conducted a party from Fort Vancouver on the Columbia to the rendezvous of the American trappers in the interior of California, i. e., southern Idaho.

Howell, Thomas. Catalogue of the flora of Washington, Oregon, and Idaho. 1884.

Contains a list of spermatophytes, pteridophytes, and mosses. A supplementary list from Klickitat County, Wash., by W. N. Suksdorf, is added.

——— Catalogue of the known plants (Phaenogamia and Pteridophyta) of Oregon, Washington and Idaho. 1887.

——— Flora of Northwestern America. 1903.

Contains descriptions of all the plants reported from Oregon, Washington, and Idaho. Incidentally many plants are stated to range into Washington, in case of which there is no definite knowledge of such occurrence.

Leiberg, John B. Two new plants from the northwest coast. Proceedings Biological Society of Washington **11**. 39–41. 1897.

Describes *Sambucus leiosperma* and *Delphinium viridescens*.

Meehan, Thomas. The plants of Lewis and Clark's expedition across the Continent, 1804-1806. Proceedings Academy Natural Sciences, Philadelphia **1898**: 12-49. 1898.

A list of the Lewis and Clark plants in the Philadelphia Academy of Sciences, mostly identified by Robinson and Greenman.

Nuttall, Thomas. A catalogue of a collection of plants made chiefly in the valleys of the Rocky Mountains or Northern Andes, toward the sources of the Columbia River, by Mr. Nathaniel B. Wyeth, and described by T. Nuttall. Read February 18, 1834. Journal of the Academy of Natural Sciences, Philadelphia, **7**: 1-60. 1834.

"This collection was made wholly on the returning route of Mr. Wyeth from the Falls of the Columbia to the first navigable waters of the Missouri."

Piper, C. V. New and noteworthy Washington plants. Botanical Gazette **22**: 488-491. 1896.

——— An undescribed black-cap raspberry. Erythea **5**: 103. 1897.

Describes *Rubus hesperius*.

——— New species of Washington plants. Erythea **6**: 29-32. 1898.

——— A new violet from Washington. Erythea **6**: 69. 1898.

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GEOGRAPHIC INDEX.

Locality.	County.
Adams, Mount	Yakima
Ainsworth	Franklin
Alkali Lake	Douglas
Alki Point	King
Alma	Okanogan
Almota	Whitman
American Lake	Pierce
Ashford	Pierce
Asotin	Asotin
Atanum River	Yakima
Badger, Mount	Douglas
Baker, Mount	Whatcom
Baldy, Mount	Peak in Kittitas
Baldy, Mount	Local name for Mount Carlton
Baldy, Mount	A peak in Chehalis
Beaver Creek	Okanogan
Billingham Bay	Whatcom
Bickleton	Klickitat
Big Creek Prairie	Chehalis
Big Meadows	Ten miles SW. of Box Canyon
Bingen	Klickitat
Bishops Bar	Snake River, Whitman
Blue Lake	Douglas
Blue Mountains	Columbia, Garfield, and Asotin
Bolles	Columbia
Boundary	Stevens
Box Canyon	Stevens, on Pend Oreille River
Brewster	Douglas
Bridge Creek	Fork of Stehekin River, Okanogan
Calispell Lake	Stevens
Cape Horn	Post-office and high cliff in Skamania
Carleton, Mount	Spokane
Castle Rock	Cowlitz
Chapaca, Mount	Okanogan
Charleston	Kitsap
Chattaroy	Spokane
Chelan	Chelan
Chelan Butte	Douglas
Chelan Lake	Chelan
Chenowith	Skamania
Chewelah	Stevens
Chiquash Mountains	Skamania
Clarkston	Asotin
Clarks Springs	Near Spokane
Clallam, town and lake	Kittitas
Cleman Mountain	Yakima
Clemens Mountain	Same as Cleman
Cleveland	Klickitat
Cold Creek	Yakima
Colockum Creek	Kittitas
Colton	Whitman
Colville	Stevens
Colville Reservation	Okanogan and Ferry
Conconully	Okanogan
Condon's Ferry	On the Columbia, Lincoln
Connell	Adams
Constance, Mount	Jefferson
Constitution, Mount	San Juan
Copolis	Chehalis
Coppei Creek	Columbia
Coulee City	Douglas
Cow Creek	Adams
Crab Creek	Lincoln
Craig's Ferry	Yakima
Crater Lake	Near Mount Rainier
Crescent Lake	Clallam
Cushman Lake	Mason
Davis Lake	Stevens
Davis Ranch	Foot of Mount Carlton, Spokane
Dayton	Columbia
Delight	Adams
Douglas City	Douglas
Duckabush River	Jefferson
Easton	Yakima
Eatonville	Pierce
Egbert Springs	Near Trinidad, Douglas
Ellensburg	Kittitas
Eltopia	Franklin
Elwha River	Clallam

Locality.	County.
Endicott	Whitman
Entiat River	Chelan
Enumclaw	King
Ephrata	Douglas
Eureka	Walla Walla
Everett	Snohomish
Everson	Whatcom
Fairhaven	Whatcom
Falcon Valley	Western Klickitat
Fish Lake	Kittitas
Fort Okanogan	Okanogan
Fort Simcoe	Yakima
Fort Vancouver	Same as Vancouver
Fort Walla Walla	Wallula
Frontier	Ferry
Fourth Plain	Clark
Garrison	Whitman
Gate City	Thurston
Glenwood	Klickitat
Goldendale	Klickitat
Granddalles	Klickitat
Granville	Chehalis
Grays Harbor	Chehalis
Green River Hot Springs	King
Goat Mountains	Near Mount Rainier
Gulf of Georgia	Northern part Puget Sound, north of San Juan
Guy	Whitman
Hangman Creek	Spokane
Harmony	Lewis
Harrington	Lincoln
Haven's Ranch	Near Mount Adams, Yakima
Hell Roaring River	Western part Yakima
Hoodsport	Mason
Horseshoe Basin	Subalpine Valley, Chelan
Hoquiam	Chehalis
Humptulips	Chehalis
Hunt's Junction	Walla Walla
Illia	Garfield
Ilwaco	Pacific
Ione	Stevens
Johnsons Canyon	Yakima
Johns Island	San Juan
Kahlotus	Franklin
Kalama	Cowlitz
Kalispel Lake	Same as Calispell
Kamiak Butte	Whitman
Keechelus Lake	Kittitas

Locality.	County.
Kellys Bar	Whitman
Kennemick	Yakima
Kettetas Valley	Same as Kittitas
Kettle Falls	Stevens
Kichelas	Same as Keechelus
Kiona	Yakima
Klickitat River	Klickitat
Kittitas Valley	Yakima River, Kittitas
Laidlaw	Chehalis
Lake Park	Pierce
Lakeview	Pierce
Lebam	Pacific
Liliwaup	Mason
Little Baldy	5 miles NE. of Spokane
Longmier Springs	Pierce
Loomis	Okanogan
Loon Lake	Stevens
Lopez Island	San Juan
Lower Cascades	Skamania
Lyle	Klickitat
Mabton	Yakima
Major Creek	Klickitat
Manor	Clark
Marcus	Stevens
Marshall Junction	Spokane
Mashel Lake and River	Pierce
Maxfield	
McAllister's Lake	Thurston
Medical Lake	Spokane
Menzies Island	Now known as Haydens Island, in Columbia River above mouth of Willamette
Meyers Falls	Stevens
Mill Plain	Clark
Monte Cristo	Snohomish
Montesano	Chehalis
Morgan's Ferry	On Yakima River, Yakima
Moses Lake	Douglas
Moss Creek	Klickitat (?)
Moxee	Yakima
Muckleshoot	King
Nahcotta	Pacific
Nason City	Chelan
Nisqually River	Boundary between Pierce and Thurston
New London	Chehalis
Newport	Stevens
North Yakima	Yakima

Locality.	County.
Nooksack River	Whatcom
Ocosta	Chehalis
Olympia	Thurston
Omach Lake	Okanogan
Ophir	Okanogan
Opposite Clarkston	Bluffs of Snake River, Whitman
Opposite Umatilla	Crimea, Klickitat
Opposite Willows	PineCreek, Klickitat
Orcas Island	San Juan
Oyhut	Chehalis
Paddo, Mount	Indian name for Mount Adams
Palouse	Whitman
Parker	Yakima
Parrotts	Lincoln
Pasco	Franklin
Pataha	Garfield
Peone	Spokane
Perkins Creek	Yakima
Peshastin	Chelan
Pine City	Whitman
Pomeroy	Garfield
Port Angelus	Clallam
Port Crescent	Clallam
Port Discovery	Jefferson
Port Ludlow	Jefferson
Prosser	Yakima
Pullman	Whitman
Puyallup	Pierce
Quinault	Chehalis
Quillayute	Clallam
Rainbow Falls	Chelan
Rainier	Thurston
Rainier, Mount	Pierce and Lewis
Rattlesnake Mountains	Yakima
Renton	King
Republic	Ferry
Ritzville	Adams
Rock Creek	Whitman
Rockford	Spokane
Rock Lake	Whitman
Rockland	Klickitat
Roslyn	Kittitas
Roy	Pierce
Salmon River	Blue Mountains, Columbia
Samish Lake	Skagit
San Juan Island	San Juan
Satus	Yakima
Scott	Klickitat
Sentinel Bluffs	Kittitas
Shoalwater Bay	Pacific
Silver Lake	Spokane
Silverton	Snohomish
Simcoe Mountains	Yakima
Skagit Pass	Summit Cascade Mountains, head of Skagit River
Skokomish Valley	Between LakeCushman and Hood's Canal
Snipes Mountain	Yakima
Snoqualmie Falls	King
South Arbor	Chehalis
Southbend	Pacific
Spanaway Lake	Pierce
Spangle	Spokane
Sprague	Lincoln
Squaw Creek	Yakima
Stampede Pass	That in Cascade Mountains crossed by N. P. R. R.
Starbuck	Columbia
Steamboat Rock	High rock in Grand Coulee, 15 miles N. of Coulee City
Steele, Mount	Peak 7,500 feet, near head of Skokomish River, Mason
Stehekin	Town and river, head of Lake Chelan, Chelan
Steilacoom	Pierce
St. Johns	Whitman
Steptoe	Whitman
Stevens Pass	In Cascade Mountains, crossed by G. N. R. R.
Stuart, Mount	Kittitas
Sunnyside	Yakima
Sutherland Lake	Clallam
Tampico	Yakima
Thorn Creek	Whitman
Tieton River	Yakima
Toppenish	Yakima
Trout Lake	Skamania
Tukanon River	Columbia
Tumtum, Mount	Clarke
Tumtum, Mount	Near Mount Rainier
Tumwater Canyon	On Wenache River, below Leavenworth
Twisp River	Okanogan
Union City	Mason
Union Flat	Whitman
Union Lake	King

Locality.	County.
Umtanum	Kittitas
Upper Cascades	Skamania
Upper Naches River	Branch of Yakima River, Yakima
Usk	Stevens
Vancouver	Clarke
Waitsburg	Columbia
Walla Walla	Wallawalla
Wallula	Wallawalla
Washington Lake	King
Washtucna	Adams
Waterville	Douglas
Waverly	Spokane
Wawawai	Whitman
Wenas	Town and river in Yakima
Wenas Creek	A branch of the Yakima River in Yakima
Wenache Mountains	Ridge of mountains forming divide between Chelan and Kittitas
Wenache River	Important stream in Chelan
Westport	Chehalis
Whidby Island	Island
White Bluff Ferry	Columbia River below Lake Chelan
White Salmon	Klickitat
Wilbur	Lincoln
Wilson Creek	Douglas
Woodlawn	Thurston
Yakima City	Yakima
Yelm Prairie	Thurston

INDEX.

(Synonyms are in italics. The principal account of the species of any genus will be found on the page or pages following the genus name. The few species names entered in the index are followed by only secondary references.)

Page.

- Abies 93
  - amabilis 12, 58
  - grandis 42, 58
  - lasiocarpa 60
  - nobilis 12
- Abronia 244
  - latifolia 47
  - umbellata 47
- Acer 385
  - macrophyllum 42
- Aceraceae 385
- Achillea 584
  - millefolium 58
- Achlys 283
- *Acomastylis* 344
- Aconite 282
- Aconitum 282
- Actaea 278
- Adams, Mount, botanical collection 19
- Adder's tongue 49, 83, 192
- Adenocaulon 607
- Adenostegia 518
- Adiantum 78
- Agastache 489
- Agoseris 541-545
- Agrimonia 335
- Agropyron 146-149
  - spicatum 48
- Agrostemma 256
- Agrostideae 102
- Agrostis 118-121
  - rossae 62
- Aira 121
- Aizoaceae 245
- Alaska cedar 91
  - heather 439
- Alchemilla 335
- Alder 219
  - red 42, 219
- Alfalfa 363
- Alfilaria 380
- *Aligera* 533
  - macroptera obtusa 614
- Alisma 100
- Alismaceae 100
- Allen, O. D. botanical collection 19
- Allium 187-189
- Allocarya 485
  - chorisiana 44
- Allotropa 435
- Almond family 348
- Alnus 219
- Alopecurus 110

Page.

- Alpine fir 93
  - meadows 33, 35
- Alsike clover 361
- Alsine 257-259
- Alyssum 287
- Amabilis fir 93
- Amaranth family 244
- Amaranthaceae 244
- Amaranthus 244
- Ambrosia 551
- Ambrosiaceae 550-552
- Amelanchier 345
  - cusickii 49
- Ammannia 398
- Ammodenia 260
- Amsinckia 480
- Amygdalaceae 348
- Anacardiaceae 383
- Anacharis 101
- Anaphalis 606
  - margaritacea revoluta 614
- Ancestry, relation to distribution of plants 33
- Anemone 267
- Angelica 418
  - hendersoni 47
- Anogra 407
- Antelope brush 36, 345
- Antennaria 601-606
  - rhodantha 614
- Anthemis 585
- Anthoxanthum 106
- *Aphyllon* 521
  - arenosum 614
  - comosum 44
  - inundatum 614
- Apiaceae 413-431
- *Aplopappus* 559, 560
- Apocynaceae 452
- Apocynum 452
- Apple family 345-347
- Aquilegia 278
  - formosa 58
- Arabis 291-295
- Araceae 177
- Aragallus 367
- Aralia 412
- Araliaceae 412
- Arbutus 437
- *Arceuthobium* 222
- Arctic life zone, altitudinal limits 36
  - character 34
  - flora 62-65

Page.

- Arctic life zone, species in Cascades, etc 37
- Arctic-Alpine species, distribution 63-65
- Arctium 611
- Arctostaphylos 437
- Arenaria 260-263
- Argentina 311
- Arid Transition area 31, 35, 36, 47-51
  - flora 51-53
- Aristida 107
- Aristolochiaceae 223
- Arnica 590-593
- Arrhenatherum 121
- Arrowhead 101
- Artemisia 586-590
  - tridentata 36
  - rigida 49
- Arum family 177
- Aruncus 332
- Asarum 223
  - caudatum 71
- Asclepiadaceae 453
- Asclepias 453
- Ash, mountain 347
- Ash, Oregon 449
  - western mountain 60
- Asparagus 202
- Aspen 49, 217
- Asperugo 476
- *Aspidium* 80, 81
- Asplenium 80
- Aster 570-575
  - conspicuus 44
  - family 552-611
- Asteraceae 552-611
- *Astragalus* 368
- Athyrium 80
- Athysanus 306
- Atriplex 241
- *Audibertia* 488
- Avena 123
- Aveneae 103
- Azalea 60
- Azolla 84

- Baeria gracilis 44
- Balm 493
- Balsam family 386
- *Balsaminaceae* (*See* Impatientaceae.)
- Balsamorhiza 580
  - sagittata 48
- Baneberry 278
- *Barbarea* 303
- Barberry family 282-283
- Barley, wall 149
  - wild 149
- Barnyard grass 105
- Batrachium 270
- Bean family 349-378
- Bear grass 60
- Beattie, R. K., botanical work 19
- Beckmannia 145
- Beech family 220
  - fern 77
- Beggar ticks 578
- Berberidaceae 282-283
- Berberis 282
  - nervosa 41

Page.

- Bergia 391
- Bermuda grass 146
- Berula 428
- Betula 218
  - glandulosa 46
  - microphylla 49
- Betulaceae 218-220
- Bibliography 615
- Bidens 578
- *Bigelovia* 558
- Bikukulla 284
- Bindweed 228
- Binns, F., botanical work in Washington 18
- Birch 49, 218
  - dwarf 46
  - family 218-220
- Birthwort family 223
- Bitter cress 303
- Bitterroot 49, 246
- Bittersweet 520
- Black hemlock 94
  - mustard 301
  - pine 46
  - sage, distribution 36
  - sunflower 49
- Blackberry, evergreen 334
- Blackcap 334
- Bladder fern 82
- Bladderwort 523
- Blepharipappus 578
- Blessed thistle 609
- Blite 243
- Blitum 243
- Blue bunchgrass 138
- Blue Mountains, botanical features, etc 70, 71, 72
  - botanical collections by Douglas 13
  - location and character 26
- Bluebell family 535-537
- Blueberry 49, 442-444
  - family 442-444
- Blue-eyed grass 203
- Bluegrass 128-135
- Bluestem 148
- Bogs, sphagnum 46
- Boisduvalia 410
- Bolandra 310
  - oregana 67
- Bolelia 537
- Bouteloua 154
- Borage family 472-486
- Boraginaceae 472-486
- Boschniakia 522
- Botanical explorations in Washington 10-20
- Botrychium 83
- Bottom lands, Western Washington 42
- Bracken 41, 78
- Brackenridge, W. D., explorations 15
- Brandegee, T. S., botanical collection 18
- Brasenia 264
- Brassica 301
- Brassicaceae 285-307
- *Brickellia* 556
- Britton, N. L. 6
- *Brodiaea* 189
- Brome grass 141-145
- Bromus 141-145
- Broomrape family 521-522

- Brown, Stewardson, 6
- *Bryanthus*, 439
- Buckbean, 452
- Buckbrush, 50, 387
- Buckthorn family, 386-388
- Buckwheat family, 224-239
- Buffalo berry, 397
- Bugseed, 241
- Bull pine, 92
  - thistle, 609-611
- Bunchgrass, bunchgrass prairies, 48
- Bunch-flower family, 195-198
- Bur clover, 363
  - reed, 95
- Burdock, 611
- Bursa, 303
- Butter-and-eggs, 495
- Buttercup, 62, 270-277
  - family, 265-282
- Buttle, John, botanical collection, 17

- Cabbage, deer, 452
- Cacaliopsis, 594
  - nardosmia, 69
    - glabrata, 69
- Cactaceae, 396
- Cactus, 397
- Cactus family, 396
- Calamagrostis, 114-118
  - aleutica, 47
  - anomala, 613
- Calandrinia, 247
- California element, Arid Transition species, 51
  - Upper Sonoran species, 38
- California, Upper, use of name, 10
- Callitrichaceae, 382
- Callitriche, 382
- Calochortus, 193-195
- Caltha, 277
  - asarifolia, 47
  - leptosepala, 62
- *Calypso*, 207
- Camas, 190
- *Camassia*, 191
- Camelina, 304
- Camp Chopunnish, botanical specimens, 11
- Campanula, 536
  - piperi, 66
- Campanulaceae, 535-537
- Campe, 303
- Canada bluegrass, 130
  - thistle, 609
- Canadian life zone, 35, 36, 58-59
- Canary grass, 106
- Canby herbarium Washington plants, 18
- Caper family, 307
- Capnoides, 284
- Capnorea, 467
  - villosula, 49
- Capparidaceae, 307
- Caprifoliaceae, 528-532
- Capriola, 146
- *Capsella*, 303
- Cardamine, 289-291
- Carduus, 609
- Carex, 161-177
  - cryptocarpa, 47
- Carex macrocephala, 47
- Carpet weed, 245
- Carrot, wild, 415
- Carum, 426
  - gairdneri, value and name, 14
- *Caryophyllaceae*. (*See* Silenaceae.)
- Cascade Mountains, physiographic and geologic features, 22-23
  - flora, 72
- Cascades, northern, plant species also in Blue Mountains, 70
- Cascara sagrada, 386
- Cashew family, 383
- Cassiope, 438
  - mertensiana, 62
- Castanopsis, 220
- Castilleja, 513-516
  - angustifolia, 58
    - subspecies, 515
  - miniata, 58
  - oreopola, 62
- Catchfly, 252-255
- Catnip, 489
- Cat-tail, 95
- Caucalis, 416
- Ceanothus, 387
  - sanguineus, 50
  - velutinus, 51
- Cedar, Alaska, 60, 91
  - giant, 71, 91
  - yellow, 91
- Celastraceae, 384
- Celery family, 413-431
- Celtis, 221
- Centaurea, 608
- Centaurion, 449
- Centunculus, 447
- Cephalanthera, 206
- Cerastium, 256
- Ceratophyllaceae, 265
- Ceratophyllum, 265
- Cercocarpus, 345
- Ceropteris, 76
- Chaenactis, 583
- Chaetochloa, 106
- Chamaecyparis, 91
  - nootkatensis, 60
- Chamisso's shield fern, 41
- Chamomile, garden, 585
- Chapman, Ronald, botanical work, 19
- Charlock, 301
- Cheat, 145
- Cheilanthes, 79
- Chelone, 503
- Chenopodiaceae, 239-244
- Chenopodium, 242
- Cherry, wild, 348
- Chickweed, 257-259
- Chicory, 538
- Chicory family, 537-549
- Chimaphila, 432
- Chinooks, description, 32
- Chlorideae, 104
- Chokecherry, 348
- Chorizanthe, 239
- Chrysanthemum, 585
- Chrysopsis, 557

Page.

- Chrysosplenium 318
- Chrysothamnus 558
  - nauseosus 36
  - viscidiflorus 36
- Cichoriaceae 537-549
- Cichorium 538
- Cicuta 426
- Cimicifuga 278
- Cinna 113
- Cinquefoil 62
- Circaea 399
- Cladothamnus 442
- Clarkia 411
- Claytonia 248-251
- Clematis 266
- Cleome 307
- Climate, remarks and tables 26-28
- Clintonia 199
- Cloudiness, Weather Bureau statistics 29
- Clover 358-363
  - alsike 362
  - bur 363
  - rabbit-foot 362
  - red 362
  - sweet 358
  - white 361
- Clubmoss 86
- Cnicus 598
- Coastal Plain, physiography and geology 20
  - vegetation 46-47
- Cockle 256
  - cow 256
- Cocklebur 550
- Coelopleurum 430
  - gmelini 47
- Coldenia 474
- Collinsia 495
- Collomia 464-465
- Columbia Basin flora 38, 40, 52
- Columbia gorge, botanical features, etc 67
- Columbia Plains, physiographic and geologic features 24
- Columbine 278
- Coleanthus 114
- Coleosanthus 556
- Comandra 223
- Comarum 341
- *Compositae*. (*See* Cichoriaceae, Ambrosiaceae, and Asteraceae.)
- Conanthus 472
- Conard, H. C., botanical work 19
- Cone flower 579
- *Coniferae*. (*See* Taxaceae and Pinaceae.)
- Conioselinum 419
  - Escheri 47
- Convallariaceae 198-202
- Convolvulaceae 454
- Convolvulus 454
- Cooper, J. G., plant collection 17
- Coptis 278
  - occidentalis 71
- Coral root 206
- Corallorhiza 206
  - leimbachiana 613
  - multiflora sulphurea 613
- Coreopsis 579
- Corispermum 241

Page.

- Corn flower 598
- Cornaceae 431
- Cornel, dwarf 58
  - western 42
- Cornus 431
  - canadensis 47, 57, 58
  - occidentalis 42
- *Corydalis* 284
- Corylus 218
- Cotton, John S., botanical work 19
- Cotton-grass 46, 158
- Cottonwood 42, 49, 217
- Cotula 586
- Coville, Frederick V 6
- Cow cockle 256
  - parsnip 417
- Crabapple 42, 347
- Crabgrass 104
- Craig Mountains, botanical collection by Douglas 13
- Cranberry, western 46, 444
- Crassulaceae 308-310
- Crataegus 346
  - brevispina 49
- Cress, bitter 303
  - penny 305
  - rock 291-295
  - water 296
- Crepis 545
- Crocidium 594
- Crowberry 383
  - family 383
- Crowfoot, water 270
- *Cruciferae*. (*See* Brassicaceae.)
- Cryptanthe 483-485
- Cryptogramma 79
- Cucurbitaceae 535-537
- *Cupuliferae*. (*See* Fagaceae.)
- Currant 323-327
  - family 323-327
  - fetid 42
  - golden 326
  - native 60
  - red flowering 326
  - red-flowered 42
  - stink 325
- Cuscuta 454-456
- Cuscutaceae 454-456
- *Cymopterus* 429
- *Cynodon* 146
- Cynoglossum 476
- Cynomarathrum 417
- Cyperaceae 154-177
- Cyperus 155
- Cypripedium 205
- *Cystopteris* 82
- Cytherea 207

- Dactylis 128
- Daisy, oxeye 585
- Dandelion 545
  - tall 541
- *Danthonia* 122
- Dasiphora 341
- Datura 520
- Daucus 415
- Death camas 198

Page.

- Deer cabbage 452
  - fern 79
- Delphinum 279-281
- Dentaria 288
- Deschampsia 123
- Devil's club 47,412
- Dewberry 41,333
- *Deyeuxia* 115
- *Dicentra* 284
- Digitalis 519
- *Digitaria* 104
- ***Diplopappus*** 567
- Dipsaceae 535
- Dipsacus 535
- Disporum 201
- Distichlis 135
  - spicata 45
- Distribution, zonal, of Washington plants 33
- Dock 224
  - yellow 225
- Dodder 45,454-456
- Dodecatheon 445-446
  - jeffreyi 62
- Dogwood 431
  - family 431
- Dondia 240
- Douglas, explorations in Washington 12
- Douglas spruce 94
- Douglasia 447
- Draba 287
- Dracocephalum 489
- Drosera 307
  - rotundifolia 46
- Droseraceae 307
- Dryas 343
- Drymocallis 342
- Dryopteris 81
- Duckweed family 177
- Dulichium 156
- Dutchman's breeches 284

- Eaton, A. A. 6
- Eatonia 125
- Echinopanax 412
  - horridum 42,47
- *Echinospermum* 474
- Eelgrass 99
- Elatine 391
- Elatinaceae 391
- Elder 530
  - red-berried 42
- Eleagnaceae 397
- Eleocharis 159-160
- Elm family 221
- Elmer, A. D. E., botanical work in Washington 19
- *Elodea* 101
- Elymus 150-152
- Empetraceae 383
- Empetrum 383
- Engelmann spruce 95
- Epilobium 399-405
  - spicatum 41
- Epipactis 211
- Equisetaceae 84
- Equisetum 84
- Eragrostis 126

Page.

- *Eremocarpus* 382
- Ericaceae 436-442
- Ericameria 559
- Erigeron 563-569
  - aureus 63
- *Eriocoma* 109
- Eriogonum 233-238
  - coryphaeum 63
- Eriophorum 158
  - russeolum 46
- Eriophyllum 583
- Eritrichum 480
- Erodium 380
- Eryngium 414
- Erysimum 299
- *Erythraea* 449
- *Erythrocoma* 344
- Erythronium 192
  - grandiflorum 49
- Eschscholzia 283
- Eucephalus 569
  - ledophyllus 66
- Euonymus 384
- Eupatorium 555
- Euphorbia family 381-382
- Euphorbiaceae 381-382
- Eurotia 241
- Euthamia 563
- Evening primrose 407
  - family 398-411
- Explorers, botanical, of Washington 10-20

- Fabaceae 349-378
- Fagaceae 220
- Fern, beech 77
  - bladder 82
  - deer 79
  - family 76-82
  - gold-back 76
  - grape 83
  - holly 80
  - lace 79
  - maiden-hair 78
  - male 82
  - wood 81
- Fernald, M. L. 6
- Fescue 135-139
- Festuca 135-139
  - myuros 613
  - reflexa 44,613
  - viridula 62
- Festuceae 103
- Feverfew 585
- Figwort 495
- Figwort family 494-519
- *Filices*. (*See* Polypodiaceae and Ophioglossaceae.)
- Filix 82
- Fir, alpine 93
  - amabilis 58,93
  - noble 58,92
  - red 41,50,58,94
  - subalpine 60
  - white 42,58,94
- Fireweed 41,401
- Flathead River, collection of plants 14
- Flax, common 380

Page.
Flax family 380
Flett, J B. 6
Flett, J. B., botanical collection in Washington 19
Floerkea 383
Forest zones, altitudinal limits 35
Forests, western Washington 41
  prehistoric 37
  yellow pine 50-51
Forget-me-not 486
Forsellesia 385
Fort Clatsop, botanical specimens 11
Fort Rock Camp, botanical specimens 11
Four-o'clock family 244
Foxglove 519
  wild 497-503
Fragaria 340
Franseria 552
Frasera 451
  fastigiata 71
Fraxinus 449
  oregana 42
Fritillaria 191
Frosts, late and early, Rocky Mountain region 32
Fumariaceae. (*See* Papaveraceae.)
Furze 358

Gaertneria 552
  chamissonis 47
Gaillardia 584
  aristata 48
Gairdner, Meredith, botanical collection 14
Galium 525-527
Gardner, N. L., botanical work 19
Garrya 432
Gaultheria 441
Gaultheria shallon 41, 47
Gaura 399
Gayophytum 407
Genera, author's position 9
Gentian 62, 450
  family 449-452
Gentiana 450
  calycosa 62, 66
Gentianaceae 449 452
Geographic index 619
Geology, discussion by districts 20-26
Georgia, New, use of name 10
Geraniaceae 378 380
Geranium 378-379
  family 378-380
  incisum 48
Geum 343
Geyer, botanical exploration 16
Giant cedar 71, 91
Gilia 459-463
Gilia 463, 464, 472
Ginger, wild 223
Ginseng family 412
Githopsis 535
Glasswort 45
Glaux 447
  maritima 45
Glehnia 429
  littoralis 47
Globe flower 277

Page.
Glossopetalon 385
Glyceria 139
Glycyrrhiza 364
Gnaphalium 606
Goatsbeard 332
Godetia 409
Goldenrod 561-563
Goldthread 278
Goodyera 208
Gooseberry 49, 323-327
Goosefoot 242
  family 239-244
Gorman, M. W. 6, 19
Gormania 309
Gorse 358
Gosmore 541
Gourd family 535-537
Gramineae. (*See* Poaceae.)
Grand Coulee, features 25
Grand Rapids, Columbia, botanical specimens 11
Grant, J. M., botanical work 18
Grape fern 83
  Oregon 282
Grass, blue-eyed 203
  family 102-154
Gratiola 503
Gravelly prairies, vegetation 42, 51
Gray Herbarium use by author 5
Grayia 241
  spinosa, distribution 36
Greasewood 36, 239
Great Basin plants in Washington 38
Green foxtail 106
Greene, E L, botanical work in Washington 18
Greenman, J M 6
Griffiths, David, botanical work 19
Grindelia 556
Grossulariaceae 323-327
Groundsel 596
Gyrostachys 211

Habenaria 208, 209, 210
Hackberry 221
Hair grass 121
Haloragidaceae 411
Harrimanella 439
Hawkweed 546-548
Hazel 218
Healall 480
Heather, Alaska 439
  family 438-442
Hedge mustard 301
Hedysarum 366
  borealis 66
  sulphurescens 66
Helenium 584
Heller, A. A., botanical collecting in Washington 19
Helianthella 582
  douglasii 48
Helianthus 582
Heliotropium 473
Hellebore, false 196
  green 196
  white 196

Page.

- Hemieva, 311
- Hemicarpha, 159
- Hemitomes, 436
- Hemizonella, 577
- Hemizonia, 577
- Hemlock, black, 60, 94
  - water, 426
  - western, 46, 58, 94
- Hemp, Indian, 453
- Henderson, L. F., 6
  - botanical work, 18
- Heracleum, 417
  - lanatum, 58
- Herbaria consulted, 5, 6
  - of Washington State, 20
- Herbs, Canadian zone, 59
  - Humid Transition, 54, 55, 56
  - Upper Sonoran, list, 39
- Heredity, relation to distribution of plants, 33
- *Hesperochiron*, 468
- Hesperogenia, 430
- Heteranthera, 178
- Heterocodon, 537
- Heuchera, 320–322
  - racemosa, 66
- Hieracium, 546–548
- *Hierochloe*, 106
- Hilgard, E. W, 18
- Hippuris, 411
- Holcus, 121
- Holly fern, 80
- Holm, Theodor, 6
- Homalocenchrus, 104
- Honeysuckle, 529
  - family, 528–532
- *Honkenya*, 260
- Honkenya peploides, 47
- Hookera, 189–190
- Hoorebekia, 559
- Hop sage, 36, 241
- Hordeae, 104
- Hordeum, 149
- Horehound, 489
- Horkelia, 339
- Horner, R. M, 6
  - botanical work in Blue Mountains, 19
- Hornwort, 265
- Horsetail, 84
- Hosackia, 364–366
- Howell, Thomas, 6
  - botanical work in Pacific northwest, 18
- Huckleberry, blue, 58
  - evergreen, 47
  - red, 41, 47
- Hudsonian life zone, 35, 36, 60–62
- Hudsonian species, distribution, 61-62
- Hull, W. R., botanical work in Washington State, 19
- Hulsea, 583
- Humid Transition, altitudinal limits, 36
  - character, 35
  - comparison of flora, 53
  - discussion, 40–47
  - temperature data, 30
- Hutchinsia, 304
- Hydastylus, 204
- Hydrangea family, 327

Page.

- Hydrangeaceae, 327
- Hydrocotyle, 431
- Hydrophyllaceae, 467–472
- Hydrophyllum, 468
- Hymenopappus, 584
- Hypericaceae, 390
- Hypericum, 390
  - scouleri, 58
- Hypochaeris, 541
- Hypopitys, 436

- Ibidium, 211
- Ilysanthes, 503
  - gratioloides depressa, 614
- Impatiens, 386
- Impatientaceae, 386
- Indian pipe, 436
  - pipe family, 435–436
  - plum, 348
- Iridaceae, 202–204
- Iris, 202
  - family, 202–204
  - missouriensis, 44, 48
- Isnardia, 399
- Isoetaceae, 88
- Isoetes, 88
- Iva, 550
- Ivy, poison, 384

- Jaumea, 582
- Jeffrey, explorations in Pacific northwest, 17
- Jewelweed, 386
- Jimson weed, 520
- Juncaceae, 178–186
- Juncoides, 184–186
- Juncus, 178–184
  - balticus, 45
  - oregana, 46
- June grass, 48
- Juniper, western, 90
  - Rocky Mountain, 90
- Juniperus, 90
  - scopulorum, 44

- Kalmia, 439
  - glauca, 46
- Kamiak Butte, character of rock, 26
  - vegetation, 35
- Kelloggia, 527
- Kentucky bluegrass, 131
- Kinnikinnick, 437
- Klamath region, plant species, 70
- Klickitat county, botanical features, etc., 68
- Koeleria, 126
- Kreager, Frank O., botanical work, 19
- Kruhsea, 202
- *Krynitskia*, 483, 485
- Kunzia, 345
  - tridentata, distribution, 36

- *Labiatae*. (*See* Menthaceae.)
- Labrador tea, 46, 441
- Lace fern, 79
- Lactuca, 548
- Lady's slipper, 205
- Lagophylla, 577
- Lake, E. R., botanical work in Washington, 19

Page.
Lake Lewis, formation ... 25
Lake John Day, formation, etc ... 24
Lamb, F. H., botanical work ... 19
Lamb's quarters ... 242
Lamium ... 490
Lappula ... 474–475
Lapsana ... 538
Larch, western ... 58, 93
  woolly ... 92
Larix ... 92
  lyallii ... 71
  occidentalis ... 58
Larkspur ... 279-281
Lathyrus ... 375-378
Laurel ... 46
  sticky ... 51, 387
Lavauxia ... 409
Leather-leaf polypody ... 77
Ledum ... 440
  columbianum ... 46
  latifolium ... 46
Leersia ... 104
Leguminosae. (*See* Fabaceae.)
Leiberg and Sandberg, botanical work in Washington ... 19
Leibergia ... 427
Lemna ... 177
Lemnaceae ... 177
Lentibulariaceae. (*See* Pinguiculaceae.)
Leontodon ... 541
Lepargyrea ... 397
Lepidium ... 304
Leptarrhena ... 310
Leptaxis ... 322
Leptorchis ... 208
Leptotaenia ... 425
  multifida ... 48
Lesquerella ... 298
Lettuce, blue ... 549
  prickly ... 549
Lewis and Clark, botanical collections in Washington ... 11
Lewisia ... 246
  rediviva ... 49
Licorice polypody ... 77
  wild ... 364
Life zones, altitudinal limits ... 36
  North American, scheme ... 34
Ligusticum ... 428
Lilaea subulata ... 44
Lilaeopsis ... 428
Liliaceae ... 186-195
Lilium ... 191
Lily ... 191
  family ... 186-195
  pine ... 197
Lily of the valley family ... 198-202
Limnanthaceae ... 383
Limnorchis ... 209–210
Limosella ... 507
Linaceae ... 380
Linanthus ... 460
Linaria ... 495
Linnaea ... 528
Linum ... 380
Liparis ... 208
Listera ... 207

Page.
Lithophragma tenella florida ... 613
    ramulosa ... 613
Lithospermum ... 486
Lloydia ... 193
Loasa family ... 395
Loasaceae ... 395
Lobelia ... 537
Lobeliaceae. (*See* Campanulaceae.)
Locoweed ... 367
Lodgepole pine ... 58, 92
Lolium ... 146
Lomaria ... 79
Lomatium ... 419–425
London Horticultural Society, botanical exploration in Washington ... 12
Lonicera ... 529
Loosestrife family ... 397
Lophanthus ... 489
Loranthaceae ... 222
Lotus ... 365
Luina ... 594
  hypoleuca ... 69
  californica ... 69
Lupine ... 48, 62, 63, 350–358
Lupinus ... 350–358
  lyalii ... 63, 66
  microcarpus ... 44
  ornatus ... 48
  sericeus ... 48
  subalpinus ... 62
  wyethii ... 48
Lutkea ... 329
  pectinata ... 62
Luzula ... 185
Lyall, botanical work in Pacific northwest ... 17
Lychnis ... 255
Lycopodiaceae ... 86
Lycopodium ... 86
Lycopus ... 491
Lysias ... 208
Lysichiton ... 177
Lythraceae ... 397
Lythrum ... 397

MacDougal, botanical collecting in Washington ... 19
Machaeranthera ... 575
Madder family ... 525–527
Madia ... 575–577
Madrona ... 437
Madronella ... 493
Mahogany, mountain ... 345
Maianthemum ... 200
Maiden-hair fern ... 78
Malaceae ... 345–347
Male fern ... 82
Mallow ... 388
  family ... 388–390
  musk ... 388
Malva ... 388
Malvaceae ... 388–390
Manzanita ... 437
Maple family ... 385
  large-leaved, distribution ... 42
  Oregon ... 385
  vine ... 42, 385
Marestail ... 411

Page.
Marigold, marsh 62, 277
Marrubium 489
Marsh marigold 277
Marsilea 84
Marsileaceae 84
Matricaria 585
Mayweed 585
Meadow fescue 138
  rue 268
Medicago 363
Melampyrum 511
Melanthaceae 195–198
Melica 127
Melilot, yellow 358
Melilotus 358
Melissa 493
Mentha 492
Menthaceae 486–493
Mentzelia 395
Menyanthaceae 452
Menyanthes 452
Menzies, botanical work in Washington 11
Menziesia 440
  ferruginea 47, 58
Merathrepta 122–123
Mertensia 476–480
Micrampelis 535
Micromeria 493
Microseris 539, 540, 541
  bigelovii 44
Microsteris 461
Milk thistle 609
Milkweed 453
Millspaugh, C. F. 6
Mimulus 507–511
  lewisii 62
Mint 492
  family 486–493
Mistletoe family 222
Mists, Oregon 29
Milk vetch 367–374
Mitella 319
  stauropetala 71
Moehringia 260
Mollugo 245
Monardella 493
Moneses 432
  uniflora 47
Monolepis 243
Monotropa 436
Monotropaceae 435–436
Montia 247
Montia 248–251
Morning-glory 454
Moses Coulee, formation 25
Moth mullein 495
Mount Stuart and Wenache mountains, botanical aspects 68
Mount Stuart region, plant species 70
Mountain ash 347
  sorrel 224
  timothy 111
Mountains, Pacific coast, floral comparisons 70
Mouse tail 269
Muhlenbergia 110
Mullein 494
Munroa 154

Page.
Mustard, black 301
  family 285–307
  hedge 301
  tumbling 302
Myosotis 486
Myosurus 269
Myrica 217
  californica 46, 47
  gale 46
Myricaceae 217
Myriophyllum 412

Nabalus 548
Naiadaceae 99
Naias 99
Nasturtium 296
Naumburgia 448
Navarretia 463
  propinqua 614
Nemophila 469
Nepeta 489
Nephrophyllidium 452
  crista-galli 47
Neslia 306
Nettle 221
  family 221
Newberrya 436
Nicotiana 521
Nightshade family 519–521
Ninebark 50, 329
Noble fir 93
Nomenclature 9
North Transcontinental Survey, botanical collections 18
Northwest Coast, use of name 10
Nothocalais 540
Nuphar 264
Nut grass 155
Nuttall, botanical collecting in Pacific northwest 14
Nyctaginaceae 244
Nymphaea 264
Nymphaeaceae 264

Oak 220
  poison 384
  vine 220
Ocean spray 330
Oenanthe 427
Oenothera 407
Oenothera 405, 406, 408
Okanogan Highlands, physiographic and geologic features 24
Oleaceae 449
Oleaster family 397
Olsynium 204
Olympic mountains, botanical features, etc. 65–66
  physiographic and geologic features 21
Onagra 407
Onagraceae 398–411
Onion 187–189
Ophioglossaceae 83–84
Ophioglossum 83
Ophrys 207
Opulaster 329
  pauciflorus 50
Opuntia 396
  polyacantha borealis 44

Page.
- Orchard grass 128
- Orchid family 205-211
- Orchidaceae 205-211
- Oreastrum 569
  - alpigenum 63
- Oregon ash 42,449
  - early extent 10
  - grape 41,282
  - Historical Society, botanical publications and notes 12,13
  - "mists" 29
  - Upper, use of name 10
- Oreocarya 481
- Orobanchaceae 521-523
- Orobanche 522
- Orogenia 430
- Orthocarpus 516-518
  - rarior 614
- Oryzeae 102
- Oryzopsis 109
- Osier, red 431
- Osmaronia 348
- *Osmorhiza* 416
- Oxalidaceae 380
- Oxalis 380
- Oxycoccus 444
  - oxycoccus intermedius 46
- Oxyria 224
- Oxytheca 239
- *Oxytropis* 367
- Oyster plant 539

- Pachistima 384
  - myrsinites 58
- Pachylophus 408
- Pacific area, character 35
- Paeonia 278
- Painted cup 62
- Paniceae 102
- Panicularia 139-140
- Panicum 105
- Papaver 283
- Papaveraceae 283-285
- Parietaria 221
- Parnassia 322
- Parrya 291
- Parsley, water 427
- Parsnip, cow 417
- Paspalum 104
- Pea 375-378
- Pear, prickly 396
- Pectocarya 482
- Pedicularis 511-512
  - bracteosa 57
  - racemosa 57
- Pellaea 78
- Penny cress 305
- Pentacaena 264
  - ramosissima 47
- Pentstemon 497-503
  - pinetorum 71
- Pepper grass 304
- Peramium 208
- Perennial ryegrass 146
- Petalostemum 350
- Petasites 593
- *cedanum* 420

Page.
- Phaca 367-374
  - hookeriana 66
- Phacelia 470-472
- Phalarideae 102
- Phalaris 106
- Phegopteris 77
- Philadelphia code observed 9
- Philadelphus 327
- *Philotria* 101
- Phleum 111
- Phlox 456-459
  - family 456-467
- Phragmites 125
- Phyllodoce 439
  - empetriformis 62
- Phyllospadix 100
- Physalis 519
- Physaria 306
  - alpestris 613
- Physiography, districts 20-26
- Physiography, Pacific northwest 10
- Physostegia 490
- Picea 95
  - engelmanni 58
  - sitchensis 41
- Pickering, Charles, explorations in Washington 15
- Pigweed 244
- Pinaceae 89-95
- Pine, black 42
  - bull 92
  - family 89-95
  - lodgepole 92
  - shore 92
  - sugar, discovery by Douglas 13
  - western white 91
  - white-bark 60,91
  - yellow 92
    - forests 50
- Pinguicula 523
- Pinguiculaceae 523
- Pink family 252-264
- Pinus 91
  - contorta 43, 46, 47, 58
  - monticola, predominance 58
  - ponderosa, preponderance, etc 50
- Piper C. V., study of Washington plants 5
- Piperia 208
  - transversa 613
- Piptocalyx 481
- Piscaria 382
- Plagiobothrys 482
- Plantaginaceae 523-525
- Plantago 523
- Plantain 523
  - family 523
  - rattlesnake 208
  - water 100
- Plants, species confined to Washington 73-74
  - species likely to be found in Washington 75
- Platyspermum 296
  - scapigerum 44
- Platystigma 284
- *Plectritis* 543
  - congesta alba 614
- Pleuricospora 436
- Pleuropogon 128

Page

- Plum, Indian 348
- Plumbaginaceae 449
- Poa 128-135
  - arctica 62
  - sandbergii 48
- Poaceae 102-154
- Poison ivy 384
  - oak 384
- Polemoniaceae 456-467
- Polemonium 466-467
  - elegans 63
  - micranthum 44
- Polygonaceae 224-239
- Polygonum 226-232
- Polypodiaceae 76-82
- Polypodium 76
- Polypody, leather-leaf 77
  - licorice 77
- Polypogon 111
- Polystichum 80
  - munitum, distribution 41
- Pondweed 96
  - family 178
- Pontederiaceae 178
- Poppy family 283-285
- Populus 217
  - tremuloides 49
  - trichocarpa 42, 49, 57
- Portulaca 245
- Portulacaceae 245-251
- Potamogeton 96
- Potamogetonaceae 96-98
- Potentilla 336-339
  - flabellifolia 62
- Prairies, bunchgrass, vegetation 48
- Precipitation, Weather Bureau tables 27-28
- Prickly pear 396
- Primrose, evening 407
  - family 444-448
- Primulaceae 444-448
- *Prosartes* 201
- Prunella 489
- Prunus 348
- Pseudotsuga 94
  - mucronata 41, 50
- Psilocarphus 607
- Psoralea 363
- Pteridium 41, 78
- *Pteris* 78
- Pterospora 435
  - andromedea 57
- Pterostegia 232
- Pteryxia 429
- Ptilocalais 541
- Ptilonella 578
- Ptiloria 539
- Puccinellia 141
- Puget Sound Basin physiography and geology 21
- Puget Sound Wilkes expedition 15
- Pulsatilla 268
  - occidentalis 62
- Pursh description of Lewis and Clark plants 11
- *Purshia* 245
- Pursiane 245
  - family 245-251

Page.

- Pyrola 433-435
  - family 432-435
- Pyrolaceae 432-435
- *Pyrrocoma* 559
- Pyrus 347
  - diversifolia, distribution 42

- Quack grass 149
- Quamash Flats, botanical specimens 11
- Quamasia 190
  - azurea 613
- Quercus 220
  - garryana 42
- Quillwort 88

- Rabbit brush 36, 558
- Rabbit-foot clover 361
- Radish 307
- Ragweed 551
  - family 550-552
- Rainfall, Weather Bureau tables 27-28
- Rainier, Mount, botanical collection 19
- Rainiera 594
- Ramm, Charles A., botanical collection 18
- Ramona 488
- Ranunculaceae 265-282
- Ranunculus 270-277
  - occidentalis laevicaulis 613
  - suksdorfii 62
- Raphanus 307
- Rapuntium 537
- Rattlesnake plantain 208
- Razoumofskya 222
- Red alder 42, 219
  - fescue 137
  - fir 41, 50, 58, 94
  - raspberry 334
- Redtop 119
- Reed 125
  - bur 95
  - canary grass 106
- Rhamnaceae 386-388
- Rhamnus 386
- Rhinanthus 511
- Rhodiola 308
- Rhododendron 440
  - albiflorum 60
- Rhus 383
- Rhynchospora 161
- Ribes 323-327
  - bracteosum 42
  - howellii 60
  - inerme 49
  - irriguum 49
  - laxiflorum 47
  - sanguineum 42
- Ricker, P. L. 6
- Rigiopappus 583
- Rimrock definition and flora 49
- Robinson, B. L. 6
- Rock cress 291-295
- Rock-rose 49, 246
- Rocky Mountain plants in Arid Transition 52
- Rocky Mountain juniper 90
- Rocky Mountains plant species 72
- Romanzoffia 468
- Roripa 296-298
- Rosa 334

Page.

Rosa gymnocarpa 50

  nutkana 49

  pisocarpa 49

Rosaceae 328-345

Rose 334

Rose family 49, 328-345

  rock 246

Rotala 398

Rough meadow grass 131

Rubiaceae 525-527

Rubus 332-334

  macropetalus 41

  nivalis 58

  parviflorus 41, 51

  spectabilis 42, 47

Rudbeckia 579

Rue, meadow 268

Ruhn, Doctor, botanical work 19

Rumex 224-226

Ruppia 99

  maritima 44

Rush 178-184

  family 178-186

  scouring 85

  wood 184-186

Russian thistle 240

Rye grass 150-152

  perennial 146

Sage, hop 241

  white 588

Sagebrush 35, 36, 49, 586-590

  common 589

  scabland 589

Sagina 259

Sagittaria 101

Salal 41, 47, 441

Salicaceae 211-217

Salicornia 240

  ambigua 45

Salix 211-217

  myrtilloides 46

  scouleriana 41

Salmon berry 42, 47, 333

Salsify 539

Salsola 240

Salt grass 45, 135

Salt marshes, vegetation 45

Salviniaceae 84

Sambucus 530

  callicarpa 42

Sandalwood family 223

Sandberg and Leiberg, botanical work in Washington 19

Sanguisorba 335

Sanicula 414

  tripartita 613

Santalaceae 223

Saponaria 256

Sarcobatus 239

  vermiculatus 36

Saussurea 611

Savastana 106

Saxifraga 312-317

  bracteosa leptopetala 613

    micropetala 613

  fragosa leucandra 613

Page.

Saxifraga paddoensis 613

  tolmiei 62, 66

Saxifragaceae 310-323

Saxifrage 312-317

  family 62, 310-323

Scablands 48

Scheuchzeria 100

  palustris 46

Scheuchzeriaceae 100

Schizonotus 330

Schoenocrambe 303

Scirpus 156-158

Scorzonella 540

Scouler, botanical work in Washington 13

Scouler willow 41, 42

Scouring rush 85

Scribneria 146

Scrophularia 495

Scrophulariaceae 494-519

Scutellaria 488

  angustifolia 44

Seashores, vegetation 45-46

Sedge 161-177

  family 154-177

Sedum 308

Selaginella 87

Selaginellaceae 87

Senecio 595-601

Sericocarpus 560

Serviceberry 49, 345

Setaria 108

Sheep sorrel 225

Shepherdia 397

Shepherd's purse 303

Shooting star 62, 445-446

Shore pine 92

Shrubs, Canadian zone 59

  Humid Transition 54, 55, 56

  Upper Sonoran 39

Sibbaldia 340

Sida 389

Sidalcea 388

Sierras, northern, flora 70

Sieversia 344

  ciliata 44

Silenaceae 252-264

Silene 252-255

Silybum 609

Sisymbrium 301-302

Sisyrinchium 203

Sitanion 153-154

Sitka spruce 41, 46, 95

Sium 430

Skullcap 488

Skunk cabbage 177

Skunk-weed 463

Smelowskia 300

Smilacina 199, 200, 202

Smith, Ernest C., botanical work in Washington 18

Smooth wild oat 123

"Snappers" 222

Snowberry 49

Solanaceae 519-521

Solanum 520

Solidago 561-563

Sonchus 549